THE BRAIN HEALTH MAGAZINE

Living Your Best Life After Brain Injury | Jan/Feb 2020

Conquering College After
CONCUSSION

THE
ANXIOUS
BRAIN

Unique Symptoms of
DYSAUTONOMIA

THE DYSAUTONOMIA ISSUE

THE BRAIN HEALTH MAGAZINE

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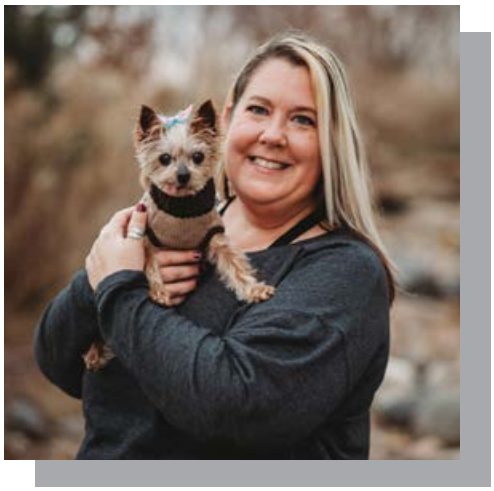

Happy New Year

Amy Zellmer | Editor-in-Chief

Happy New Year, everyone!! I am excited to kick off the New Year with an issue all about **dysautonomia**. This is such a misunderstood and often misdiagnosed symptom of brain injury. If you have a brain injury, there's a very high likelihood that you have some form of dysautonomia, which can range from relatively mild, to so severe it's hard for you to function.

When I first found Functional Neurology, I was blown away by the amount of symptoms they validated and said were absolutely part of my brain injury — something that no other provider had acknowledged in the two and a half years prior. I had been struggling with so many dysautonomia symptoms and had zero idea they were all intertwined.

You really DO begin to think you're crazy when doctors keep telling you that it's all in your head, or that the symptoms you're having can't possibly be from a concussion.

Racing heart, sweaty palms, feeling lightheaded or that you're going to pass out, startling at loud noises, brain fog, overstimulation, whooshing in your ears, pulsating headache, etc. — *it all sounds like anxiety, right?*

Did you know that these are ALL symptoms of dysautonomia?

Dysuautnomia happens when there is a dysfunction in the autonomic system. The autonomic system is the part of the central and peripheral nervous systems that is responsible for regulating involuntary body functions, such as heartbeat, blood flow, breathing, and digestion.

Many of the symptoms of dysautonomia are overlooked by professionals and written off as anxiety or other mental health conditions. This can lead to years of struggling and even being given unnecessary medications.

It's critical that we, as patients and/or advocates, take charge of our own healthcare. Your doctors works for you, not the other way around. We have grown up in a society that has taught us to blindly trust our doctors, but the truth is: doctors can't know *everything*. Unfortunately, brain injury is one area in particular that doctors struggle with, therefore it can result in the patient struggling tenfold.

By creating this magazine, my hope is to help enlighten the millions of people across the globe that are struggling with brain injury and help them find the proper resources sooner. There IS hope, and there ARE doctors who truly understand how to help you!

Knowledge is power!

Peace & Glitter,

Is Dysautonomia a Major Factor in Post-Traumatic Headaches?

BY JONATHAN CHUNG, DC

Persistent headaches are arguably the most common problem associated with persistent post-concussion symptoms. While these headaches do look and feel similar to migraine headaches, they have their own classification under the umbrella of post-traumatic headache (PTH).

Even though PTH has its own category and has been researched extensively, clinicians and scientists have struggled to define these headaches in a clinically useful way.

- What anatomy is triggering the pain?
- What kind of blood test or imaging can help identify PTH?
- What kind of pain and symptom pattern does PTH show?

There has been very little consensus on this. Some have attributed these headaches to injuries in the cervical spine. Others say that these headaches are a result of a pain sensitization process occurring in the brain or spinal cord. The only thing we really know about these headaches is that they began or worsened following a trauma to the head and neck.

A 2018 study published in the American Headache Society's Journal *Headache* has raised an interesting question about the role of the autonomic nervous system in PTH. While it has become a well-established concept that the autonomic nervous system is subject to dysfunction after a concussion, it wasn't understood whether it played a role in headache syndromes. Dr. Levi Howard and his team decided to see if symptoms of

autonomic dysfunction could differentiate patients with PTH from patients with migraine headaches.

The study showed that patients with PTH scored significantly higher on a survey for dysautonomia called the COMPASS-31 compared to both normal controls and migraine patients. The authors found that the scores of patients with PTH were similar to those with conditions like small-fiber polyneuropathy, but not quite at the level of postural orthostatic tachycardia syndrome (POTS) or pure autonomic failure.

What Does This Mean for Treatment?

Understanding the role of dysautonomia in persistent post-concussion symptoms is still in its infancy but there are studies showing that when the signs of autonomic dysfunction improve, the persistent post-concussion symptoms improve as well. One of the most important new treatments for concussion is sub-symptom threshold exercise therapy, and the rationale for the therapy is that it helps to rehabilitate the autonomic nervous system's ability to regulate blood flow to the brain.

Furthermore, there are a number of safe ways to measure and improve autonomic function. One important tool that is becoming more widely available is heart-rate variability (HRV). HRV crunches data from your pulse to provide a surrogate measurement for the function of the autonomic nervous system. Higher HRV scores are associated with decreased stress responses and improved recovery from stroke, cancer, and other illnesses. Previously you could only measure HRV from an EKG, but now there are dozens of apps and fitness trackers that can easily provide this data.

"When the signs of autonomic dysfunction improve, the persistent post-concussion symptoms improve as well."

With the right supervision, you can measure the impact of sleep and exercise on your body's recovery. You can also see if different therapies are improving autonomic nervous system function in conjunction with headaches. Some non-invasive therapies that are known to improve HRV and headaches include yoga, meditation, cardiovascular exercise, and chiropractic care.

Jonathan Chung, DC is the founder and upper cervical chiropractor at Keystone Chiropractic and Neuroplasticity in Wellington, Florida. Learn more about their cervical vestibular rehabilitation program at www.chiropractickeystone.com.

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DID YOU JUST "DYS" ME?!

BY KELLY HARRIGAN

Do you want the bad news or the good news? Okay, here goes with the knockout punch: dysautonomia affects more than 70 million people worldwide and, at this time, there is no cure. The good news? Now that you know what you're dealing with, you can educate yourself (and others) to manage this DYS-order.

I feel like I've been dissed ... Probably, but it wasn't your fault. Let's break the word down so we know what it means. *Dys* means bad or difficult. *Autonomia* refers to self-governing or self-regulating. "Houston, we have a problem," regulating our body's nervous system with functions we take for granted. Dysautonomia comes in two forms: 1) primary, which is inherited or genetic, and 2) secondary, which results from another condition or an injury.

How do we solve a problem like dysautonomia? Find a good functional neurologist or integrative medicine doctor. When trauma occurs in the brain, it disrupts many systems in the body. Unfortunately, most doctors are specialized, meaning they deal only in one area of practice, like the heart for instance. Dysautonomia needs a multi-disciplinary approach, and because its symptoms can be so generic (meaning they are symptomatic of other diseases or illnesses), it's hard to pinpoint a diagnosis. It doesn't help that our healthcare insurance has become a fast-food approach — in and out with the most profit — leaving us to see an organic and holistic approach visible only in the rearview mirror.

Symptoms vary; they come and go, and are triggered by physical, emotional, and environmental stressors. A smattering of symptoms include:

- Low blood pressure
- Low energy — feeling like you can barely move
- Heart palpitations
- Feeling weak
- Mood swings and irritability
- Anxiety
- Trouble sleeping
- Dizziness, fainting, or vertigo
- Tremors
- Low glucose levels
- Migraines and headaches
- Trouble regulating your body's temperature
- Loss of appetite
- Visual disturbances
- Aversion to light and sound — so not a fan of "shock and awe"
- Problems with urination or constipation
- Brain fog
- Attention and focus issues

These symptoms can be attributed to the brain injury itself as post-concussive syndrome, and not be diagnosed as dysautonomia resulting from the brain injury. It can be frustrating for those who have dysautonomia, and their symptoms are seen by an endless round of specialists or are dismissed with statements like "it's all in your head," "you should workout more," "you look great though," "eat more and gain some weight" or "you're probably just depressed...get out a little more." If you had a dime for every time you heard that — you'd a member of the millionaire club.

Temperature regulation seems to contend to be a top symptom, feeling "hot, hot, hot," or like "ice ice, baby." Your body temperature might not be in the normal range and might run a few degrees on either side of normal. You may feel you need a fur coat when the temperature

"It's a true statement that we need patience, along with doing some low-tech management."

dips below 70, with every hair on your arms standing up, covered in goosebumps, longing for those summer nights. Yet, when summer arrives, along with the humidity, you might feel like you have to crawl to your bed and inject IV fluids to avoid brain fog, confusion, dehydration, and dizziness.

Other top contenders are low blood pressure and fatigue. Changes in blood pressure may occur upon standing and with changes in your heart rate — a drop that's too fast and too far can cause you to faint. No need to point out the obvious that you could hit your head. (I'm mentally face palming myself at the irony.) The fatigue is can be so intense — bone-wearying, feels like death, and includes brain fog and muscle weakness. Would you rather run a marathon, do a school science project, and twelve loads of laundry in one day — or deal with a day of dysautonomia fatigue? That was a trick question...

Sounds like I need a little patience ... It's a true statement that we need patience, along with doing some low-tech management:

- Stand up slowly and elevate your upper body when sleeping to reduce that blood pressure drop when you rise, which decreases your chances of fainting.
- Make like a camel. Hydrate and use electrolytes. We're a naturally dehydrated population with our caffeine fixes, so drink lots of water. Keep it in your car, by your bed, and while binge watching movies.
- Consider adding Himalayan sea salt to your diet to help balance electrolytes, give your body an assist in retaining water, while giving your blood pressure a much-needed boost. You should definitely consult with your practitioner before taking this tip.
- For fun in the sun — skip the sun and stay in the shade or inside with the air conditioning and the fan. Keep a small fan by your bed or chair for when your internal Mt. Vesuvius erupts.
- Store an extra-cool fashion hoodie in the car for the advent of the Ice Age. Start a new fashion trend with all the scarves you'll be wearing to keep warm.
- Don't try to climb Mt. Everest or participate in the Tour de France just yet. Instead, practice moderate exercise, like walking.
- Eat ... while you're not fattening up for the holidays like Santa Claus, you do need to maintain and get proper nutrition even if your appetite has disappeared. Keep some bars on hand like Crickstart or 88 Acres brands for gluten-free, non-GMO, protein-style snacks, or get snack bags of almonds. Or, consider adding some protein drinks, like Remedy Organics, to get your two-fer: hydration and protein.
- Your future is so bright you gotta wear shades ... wear them when you need to, indoors or outdoors. And add some inexpensive silicone earplugs to help with your noise aversion or go hardcore and treat yourself to some Beats.
- Be kind to yourself.

Disclaimer: As always, please consult with a licensed medical practitioner for your medical needs.

Kelly is a single mum, veteran, and TBI survivor with a girl child and a frenchie. With oolong tea and humor on hand, she lives in Annapolis, Maryland.

Benefits of Walking

**BY SUE WILSON,
MA, ATC/L, PES, CHHC**

Physical activity is critical to soothing the mind, body and soul. Walking is one of the best ways to get into an exercise routine because it is simple and needs very little equipment. The exercise of walking can work muscle groups, burn calories, improve circulation, reduce cholesterol and increase the overall quality of life for the person.

Walking can be done in your home on a treadmill, around your neighborhood or work place or down a beautiful nature trail. If you are chair-bound, you can work on lifting your legs and placing them down one at a time to stimulate walking.

Walking at a good brisk pace speeds up the metabolism and in turn activates the body to burn stored fat. You can start at a slow pace and work your way to a faster pace. Everyone must start at their comfort level and stay at that pace for 2–3 weeks. Once you create a lifestyle change of walking 3–4 times a week as a routine, then you can start to increase your pace. Once you have increased your pace, keep that pace for 3–4 weeks and then advance again to a good brisk walk.

The faster the pace you walk, the more calories you will burn, but more importantly, the more oxygen that will be circulated throughout your body. Increased oxygen to the brain will help heal damaged cells, and increased blood flow will help with healing of the surrounding tissues.

Walking is one of the best exercises for maintaining a healthy weight while also increasing muscle mass and tone. One of the side effects of suffering from a chronic brain injury can be an emotional state that does not encourage exercise, and this leaves the body more susceptible to weaker bones. Walking every day will stimulate and strengthen bones to maintain bone density that is critical to prevent osteoporosis and promote excellent joint health.

Outdoor walking can be extremely beneficial for the calming of the brain. The fresh air and sense of peace that comes with walking on a trail or enjoying the flowers can increase the body's awareness of feeling content. The more the brain can be in a state of calm and peace, the more the emotions and frustrations can be controlled.

Start your routine today and schedule a 30-minute walk into most days of the week. Early morning walks can help set the brain for the coming day, and night-time walks can help calm the brain and prepare for sleep.

Research recommends a good, brisk pace for 30 minutes, 3–4 times a week to gain the amazing benefits of walking for the mind, body and soul.

Sue received her master's degree in Exercise Physiology from Minnesota State University, Mankato. She is a Certified Holistic Health Coach, a Certified Athletic Trainer, and a loving mother of two. She's on the board of directors for CTE Hope and is dedicated to helping improve the lives of those who have been affected by concussion and brain injury.

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Conquering College After *Concussion*

Story and Photos by
Amy Zellmer, Editor-in-Chief

Looking at college freshman Rachel Mischel you wouldn't know that she has struggled with lingering symptoms from multiple concussions suffered several years ago.

Fortunately for Rachel she found the right treatment path, but it was a long road getting there.

In 2017, during her junior year, she sustained her first (documented) concussion while playing varsity volleyball. Diving to save a ball, she hit her head on the floor and heard her neck crack. She saved the ball but when she got up and cracked her neck the other way to relieve it, she felt woozy. No one realized she had hit her head. Those who heard it thought she hit her elbow so she didn't argue with them and went back into the game.

Later that night she was freezing cold and remembers not being able to get warm when she went to bed, even though the house was quite warm.

The next day at practice she couldn't get the words out to call the ball. She couldn't say "Mine" and pass the ball; she could only do one or the other. This was troublesome for her, as she was the libero and needed to be able to communicate her calls to the team. She was exhausted after practice, but still didn't realize she had a concussion.

A few days later her neck was still quite sore and she asked the athletic trainer to stretch her neck. The trainer asked if she had any other issue and Rachel responded, "Yeah, I have a headache."

The trainer decided to do a concussion test using the SCAT test. Rachel was only able to remember three of the five words given to her, her balance was off, and she couldn't stand with her eyes shut. The trainer made her sit out of practice.

The next day she was only able to remember two of the five words, her neck was still tight, and she still had the headache. The trainer refused to clear her to play volleyball that night, which devastated Rachel. "It was the first time I'd ever had to sit out. It was foreign to me. I was totally prepared to play through, just as I'd always played through every injury."

Return-to-Play Protocol

The school's return-to-play protocol included passing the SCAT test, and then passing the IMPACT computerized test. After that, there was a five-day progression to get back to practice, first with no contact, then full contact. The player had to pass each level before receiving permission to play.

Rachel continued to struggle with the SCAT test for about a month. She took the IMPACT several times before passing, and she admitted to sort-of lying when she self-reported symptoms (e.g., Are you dizzy? Do you have a headache?).

All of this happened right before regionals and Rachel was determined to play. Her trainer helped her work hard at getting through the protocols. By the time she was finally cleared she had one day to practice before the first regional game.

Rachel was uncharacteristically nervous playing during regionals, and knew she probably shouldn't be playing as

the dives were taking a toll on her. The team made it to the state finals, during which Rachel remembers zoning out during the games and that her eyes had trouble focusing. She was determined to play through it and didn't tell the trainer she was struggling.

The volleyball tournament ended on a Saturday, and basketball practice started the following Monday. During the third day of basketball practice, Rachel took an elbow to the head but got up and kept going. When she came off the floor her coach asked Rachel if she was okay. She said she was fine, just a little dizzy. He wanted her to sit out for a bit, but she insisted she was fine and went back into practice.

After practice, the coach ordered Rachel to see the trainers. Her symptoms were more obvious right away. She didn't know where she was and couldn't answer any of the trainer's questions. She kept staring off and was dazed and confused. She stood near the garbage can because she thought she was going to throw up. Her eyes and head hurt. Everything was too bright and too loud.

The trainer called Rachel's mother to pick her up and told Rachel to get her stuff from her locker. She wandered the halls looking for her locker and then couldn't remember the combination to the padlock. Her mom noticed she was mixing up her words and wasn't making sense, and thought Rachel looked like she was high or drunk.

The next day was Thanksgiving and family members kept asking what was wrong with Rachel. They could tell something was off. When she went back to school the following Monday Rachel couldn't understand what the teachers were saying. "They all sounded like Charlie Brown's mom," she said. Her friends kept asking if she was okay, and were freaked out because one of Rachel's eyes was dilated more than the other. She was sweating and pale and acting strange enough that one of her friends called her mom and told her she should really come get her. The trainer advised them that they should go to the hospital.

The ER doctor didn't feel a CT scan was necessary but Rachel's mom pushed for the imaging until he said, "Okay, we'll do it if it will make you feel better and give you peace of mind." The scan came back clear but Rachel's mom wasn't satisfied and took her to a chiropractor because her neck was still super tight and sore. When he looked at her CT, he saw a vertebrae was out of place and was putting pressure on Rachel's brain stem.

Rachel continued going to school but sat out the entire season of basketball and spent much of her time seeing teachers after school because she was struggling. Her teachers were accommodating because Rachel had always been a 4.0 student, so they knew she wasn't faking it. They were worried because her personality had completely changed; she was zombie-like in class, not her normal bubbly self.

Rachel's mom had been searching for resources to help her, and in the spring, she met Jami and Braden Benz. Like her, Jami had searched for help when her son Braden suffered a concussion a year earlier. Jami told her, "Don't waste your time here in Bismarck (North Dakota). Go to The Functional Neurology Center in Minnesota." As luck would have it, the Center had a cancellation and Rachel was able to get into TheFNC the following week where she worked with Dr. Erik Reis.

From the Doctor

"Rachel came to our office with persistent symptoms of headaches, neck pain, dizziness, fatigue, altered balance/coordination, visual strain/blurry vision, and changes in her cognitive processing. She was struggling in school and with sports and saw a dramatic change in her lifestyle at home as a result of her concussion, which seemed small at the time, but eventually changed the way she functioned throughout the day.

"When she was in the office, we did a major workup on her, including a bedside assessment, objective diagnostic testing, tilt table evaluations, and in-depth metabolic testing to assess potential underlying nutrition deficiencies. It was evident that she was struggling with multiple factors, with the biggest

"It was the first time I'd ever had to sit out. It was foreign to me. I was totally prepared to play through, just as I'd always played through every injury."

one being her inability to handle body-based movements like going from seated to standing without getting dizzy and/or disoriented, a condition known as dysautonomia, which can also include cold hands/feet, rapid alterations in heart rate and blood pressure, and heart palpitations. That factor alone would explain a lot of what Rachel was experiencing, as she was operating at a far lower capacity due to the fact that her brain wasn't getting adequate blood flow throughout the day, especially while in school. Her associated symptoms of dizziness, altered balance/coordination, and delays in cognitive processing were primarily and secondarily affected by this as well, which further promoted this type of dysfunction.

"Our first week together showed great results, with Rachel leaving with notable changes in her headaches, dizziness, and energy levels, which remained constant and continued to improve as time went on. She wasn't perfect, as she was slowly getting back into playing sports and had a few flare-ups here and there with the headaches and dizziness, so we had to work out a plan to pick and choose our battles with her therapies and rest, as this is always a big factor in recovery. Over time, Rachel continued to make great strides in getting back to her normal self. With continued care and virtual check-ups, she was able to get back to her regular status and eventually get back to her true passion, playing sports.

"Before seeing us in the office, Rachel had tried a lot of standard therapies, including continued rest and recovery, but it wasn't enough. She wasn't a part of the lucky 80% of people who eventually "fully" recover from a concussion on their own, so we had to take a different approach with her treatment(s). Over the past few years we have realized how important cardiovascular exercise can be in the recovery from a brain injury, so we used this information to our advantage, as Rachel was already very athletic and had an athletic mindset toward her therapy.

"Rachel made great progress both in *and* outside of our office, which is an important factor to take into consideration, as therapy can and *should* happen in both places under the appropriate circumstances. As she was the one who had to do all the hard work, we must give Rachel 99.9% of the credit for her recovery, which is a factor that also speaks volumes to the type of person she is and has continued to become."

"The intensive week changed my life, Rachel says. "I had energy again, could think clearly, and actually felt alive again. It's was like when you have a dirty windshield and then wipe it off and can see clearly again."

When she went back to school the following week, she still had accommodations; however, the teachers could see a difference. They could tell by her eyes that she was better — her eyes were no longer glossed over and she was no longer zoning out, they also could tell that she comprehended what they were saying.

"Doctors can only take you so far ... you have to be accountable and take the responsibility to do the exercises."

Dr. Reis wanted Rachel to get back to playing sports and begin practice, but her family and coaches in Bismarck wanted her to wait. She had to follow protocol and be cleared by the trainer, which she finally was after a few weeks. She was able to play the rest of the softball season.

During basketball camp the next summer Rachel took yet another hit to the head and went to TheFNC for a three-day follow-up with Dr. Reis. Because she now had the tools to control her recovery, she bounced back fairly quickly.

During her senior year Rachel felt 90% recovered and was able to play a full season of volleyball as well as basketball — until she tore ligaments in her ankle.

Rachel went on to graduate high school as valedictorian with a 4.0 and is now a freshman at University of Mary in Bismarck. Before her experience at TheFNC she was undecided about what she wanted to major in but was always interested in the brain and how it functions. After working with Dr. Reis, she decided on a biology/pre-chiropractic major and plans to attend Northwestern Health Sciences University in Bloomington, Minnesota, as well as Florida's Carrick Institute in preparation to becoming a functional neurologist so she can help others after concussion.

Her advice to anyone struggling with the effects of brain injury is, "No matter what comes your way, never give up. You can't go back in time — it happened and you're not going to reverse it. Get the help you need, and once you get that help continue to do the exercises. Doctors can only take you so far; at some point you have to be accountable and take the responsibility to do the exercises and continue your treatment plan. But no matter what, never give up!"

Editor's Note:

If you think you or a teammate have suffered a concussion during practice or play, please report it to the athletic trainer or coach immediately. Even when the player thinks they're "fine" they aren't in the right frame of mind to make coherent decisions if they have been concussed. It's important to pull a player out; a second impact can have devastating effects. If you are a parent, you know your child best. If they aren't acting "right" be persistent in your quest to find out what is wrong and how to help them. Most important: Do not let them play again until their symptoms have resolved, even if a coach insists that they're "fine."

Are Faulty Veins to Blame for Dysautonomia After a Concussion?

BY JONATHAN CHUNG, DC

Dysfunction of the autonomic nervous system has become a more widely recognized problem in concussion research in the past 5 years. However, translating this knowledge into effective treatment has been lacking because many clinicians still don't recognize the subtle signs of autonomic dysfunction or how to treat them.

One important question to address is: Why might some patients be more prone to autonomic problems after a concussion? One possible mechanism observed by prominent upper-cervical chiropractors involves the way trauma can disrupt blood and cerebral spinal fluid flow in the brain.

The neck is loaded with veins that remove blood from your brain after it has used oxygen. The primary vein that does this is the internal jugular vein. Studies have shown that disruptions in blood flow from the internal jugular vein are associated with conditions like multiple sclerosis, migraine headache, and mild traumatic brain injury. Disruptions in venous blood flow can lead to a slow build-up of toxic metabolites and trigger reflux in both venous blood and cerebral spinal fluid flow. It's possible that this aberrant flow can disrupt normal function of the brain stem as well as perpetuating neuroinflammation after trauma.

This becomes relevant in a conversation about dysautonomia because balloon angioplasty treatments that address faulty jugular veins have been shown to improve signs and symptoms of dysautonomia. One area that can affect these venous structures is the upper neck. Because head injuries can also injure the upper neck, there's potential for concussive injuries to alter the mechanics of how the neck moves and impact these venous structures. It's been shown that rotational malpositions of the atlas vertebra have correlated to venous dysfunction in MS patients.

While this is a theory that has yet to be tested in a concussed population, there are numerous reports of patients with dysautonomia after neck trauma experiencing improvement in autonomic function when the upper neck is treated appropriately. While getting a balloon inserted into the jugular vein can carry greater risk, a more conservative approach through low-force upper cervical correction can provide a safe way to potentially address these difficult symptoms.

Jonathan Chung, DC is the founder and upper cervical chiropractor at Keystone Chiropractic and Neuroplasticity in Wellington, Florida. Learn more about their cervical vestibular rehabilitation program at www.chiropractickeystone.com.

BRAIN JOKE!

Q: What kind of fish performs brain surgery?

A: *A neurosturgeon.*

3 Warrior Powers of Amethyst

BY KRISTEN BROWN

Today's world is filled with elements that drain our energy, damage our brain and body, and impact how we are able think and act at work and at home. We are constantly battling these elements to maintain a clear and focused mind and fully functioning body.

Amethyst is a brilliant purple quartz crystal that evokes lightness and clarity. Its roots in Greek language mean "not intoxicated," which referenced that the stone protected owners from drunkenness. This also means it creates a clear mind free from stress and worry.

Known as a stone for the crown chakra located at the top of the head, it is a perfect stone for brain functioning and drawing in energy to help with headaches, sleep, and protection from external negative energies.

Some of the most powerful and awesome healing properties of amethyst truly turn you into a warrior:

1. **Shield —** The energetic properties of amethyst create a boundary of spiritual light around your body. Simply carrying this powerful shield keeps out environmental damage to the body, negative energy from other people, and other deteriorating effects on the brain and body.

2. **Sword —** Amethyst can help you cut cords to things you're attached to that no longer serve you. Whether it's a past experience, a toxic person, or internal thought pattern, using amethyst during meditation can help you release negative elements in your life.

3. **Peace —** When you need to win the battle and have peace in your life, amethyst can help you get there. It clears the space around you and in your head so you are free from worry and anxiety. It promotes a positive thought pattern and can also inspire creative and focused thinking.

Simply set some amethyst on your desk, bedside table, or carry it in your pocket. Its gentle but powerful energy can help you fight the battles of the day and create a peaceful environment no matter what comes your way.

Kristen Brown is a bestselling author, keynote speaker, and energy medicine practitioner who charges up her clients by syncing up their body/mind/spirit for work and life growth. Learn more at www.namaSync.com.

Yoga: Reverse Warrior

AMY ZELLMER, EDITOR-IN-CHIEF | HEALTHY LIVING

Yoga is a powerful tool for recovery after brain injury. Contrary to some beliefs, EVERYONE can do yoga — you don't need to be super flexible, have great balance, or even be able to stand up. The beauty of yoga is that every pose can be modified so that anyone can be accommodated.

An important aspect of yoga is the breath. Connecting the breath to your body and flow, and getting oxygen flowing to your brain, is what makes it so powerful for recovery. Yoga is also a time to quiet the mind, letting anxiety and distracting thoughts drift away.

Reverse Warrior (Viparita Virabhadrasana) is a standing pose that stretches the waist and energizes the entire body. The word "Viparita" means "reverse" in Sanskrit, and "asana" means "pose."

Some of its benefits are that it strengthens the hips, quads, arms, shoulders, torso, and neck. It also increases energy and stamina, and encourages confidence, focus, and willpower. This pose helps the practitioner feel more confident and empowered, while learning to set boundaries. It can also help tame the ego if it is out of balance.

Instructions:

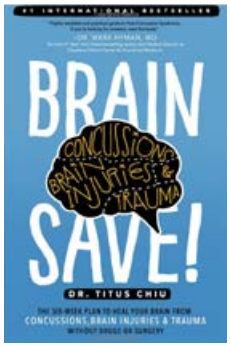
1. Stand with feet hip-distance apart, arms at your sides. Turn to your left, stepping both feet wide, aligning the heels.
2. Turn the right foot out 90 degrees, so the toes are pointing to the top of the mat. Pivot the left foot slightly inwards.
3. Raise the arms to the side at shoulder height, parallel to the floor. With palms facing down, reach actively from fingertip to fingertip.
4. Exhale while bending the front knee. Align the knee directly over the ankle of the front foot, taking care that the front shin is perpendicular to the floor. Sink your hips low, eventually bringing the front thigh parallel to the floor. You are now in Warrior II pose.
5. With the next exhale, drop the left (back) hand to the left thigh. With the next inhale, lift the right arm straight up, reaching your fingertips to the ceiling. The right bicep should be next to the right ear.
6. Keeping the front knee bent, sink the hips low while lengthening the sides of the waist. Slide the back hand farther down the leg and come to a slight backbend.
7. Tilt the head slightly and gaze to the right hand's fingertips.
8. Keep the shoulders relaxed, chest lifted, and sides of the waist long.
9. Hold for 10–20 breaths.
10. To release from the pose, inhale and lower the arms back to Warrior II. Press down through the back foot while straightening the front leg. Lower the arms. Turn to the left, reversing the position of the feet, and repeat on the opposite side.

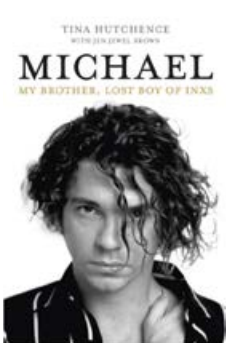
Modifications:

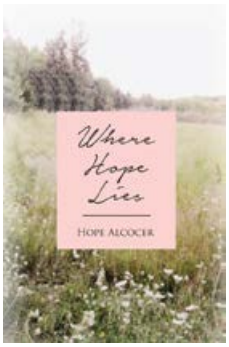
- For more stability, practice with the outer edge of your back foot pressing into a wall.
- Practice against a wall to help align your hips and shoulders if you have issues with your balance.
- Although Reverse Warrior has many benefits, persons with neck injuries should keep their gaze forward in the pose (see photo) instead of tilting their head backwards.
- If you begin to feel pain in your low back, ease away from the backbend until you can once again find length and space.

If you are interested in learning more about yoga, check out www.loveyourbrain.com and their yoga programs throughout the U.S. at partner studios, which are completely free to brain injury survivors and caregivers.

SUGGESTED READING







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Essential Oils: Frankincense and Frankincense Vitality

AMY ZELLMER, EDITOR-IN-CHIEF | HEALTHY LIVING

Essential oils are a complementary tool that can help you achieve a healthy lifestyle. They are easy to use, smell great, and you can use them in a variety of ways.

Please know that all oils are not created equally. Young Living is the only brand I personally trust, as I know they have complete control over their product from seed to seal. Oils sold at health food stores can be misleading. Without FDA regulation, they may state they are 100% therapeutic grade oils ... but you must be sure to look closely at the labels. If the ingredients list anything other than the plant stated, or if it says things like "external use only," "for aromatic use only," and "dilute properly," these are red flags that the oil inside that bottle are not 100%, and likely they have been cut with other oils, synthetics, or chemicals.

Frankincense: Frankincense essential oil has a broad range of uses, from enhancing spiritual and meditative practice to use in beauty routines. Frankincense has an earthy, uplifting aroma that's perfect for grounding and spiritual connectedness.

It's no surprise that Frankincense (Boswellia carterii) has been sought after since ancient times. The complex aroma of this oil can elevate many aspects of your life. Diffuse Young Living Frankincense oil to refine your sense of purpose, and create a safe and comforting environment. It's a powerful oil to use when you are seeking purpose or engaged in prayer, meditation, or a yoga practice.

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Frankincense Vitality: Distilled from the resin of trees in the Boswellia carterii tree family, Frankincense Vitality™ oil contains the naturally occurring constituent basic ingredient alpha-pinene, which is what gives it its distinctive rich, balsamic scent.

Frankincense is rich with tradition, and its taste is unmistakable. Frankincense Vitality™ essential oil carries a rich, sweet, woodsy flavor and properties that can help support overall wellbeing and a healthy immune system when taken internally (1-2 drops in a capsule, or added to your daily bottle of water).

A High Sodium Diet May Help Alleviate Symptoms of Dysautonomia

HEALTHY LIVING

BY SIERRA FAWN GUAY, MS, RDN, LDN

Disclaimer: This article is not meant to replace personalized medical advice. A high sodium diet may not be right for you.

Dysautonomia describes a set of conditions resulting from the malfunction of the autonomic nervous system. Postural orthostatic tachycardia syndrome (POTS) is a certain type of dysautonmia that is characterized by an exaggerated increase in heart rate that occurs or is exacerbated in the upright or standing positions. In order to help alleviate the symptoms associated with POTS, doctors often prescribe a high-sodium, high-fluid diet that is intended to help increase blood volume.

Sodium recommendations for people living with POTS may range from 3,000 to 10,000 mg per day. Though

it is common to consume a high-sodium diet by eating processed foods (foods with a lot of added, unfamiliar ingredients) or fast foods, it is important to increase sodium intake without compromising overall health. Therefore, sodium should be consumed primarily though the intake of fresh foods in the context of a well-balanced diet.

"It is important to increase sodium intake without compromising overall health. Therefore, sodium should be consumed primarily through the intake of fresh foods in the context of a well-balanced diet."

The Adequate Intake (AI) of sodium for healthy people (set by the U.S. Food and Drug Administration or FDA) is 1,500 mg per day. To put that number into perspective, one teaspoon of table salt contains 2,300 mg of sodium.

Consuming 10,000 mg of sodium per day may seem like a daunting task, especially for people who are not used to a high-sodium diet. Preference for sodium is acquired, which means that one can increase his or her preference for salty foods by gradually increasing sodium intake. It can be helpful to eat small, frequent meals to better spread sodium intake throughout the day.

Most table salt (which is a combination of sodium and chloride) contains iodine, an essential nutrient. In order to avoid excessive iodine intake in a high-sodium diet, it is advisable to use iodized salt with meals and non-iodized salt with cooking.

Recommended daily fluid intake for people living with POTS is often about two liters per day. It is essential to consume adequate fluid when consuming a high-sodium diet in order to maintain good hydration status. Water is always a good choice. It may be helpful to consume rehydration fluids or sports drinks that contain sodium, provided that these drinks are not high in added sugars.

Many foods are naturally high in sodium and are easy to include in a healthy diet. Some of these foods are: pickles, olives, cheese, soy sauce, salted nuts, and more!

Sierra is a registered dietitian who works with brain injury survivors in Greenville, North Carolina.

POTATO PICKLE SALAD

Makes three servings. Sodium per serving: about 2,250 mg.

Ingredients:

3 tbsp. salted butter
1 medium onion, sliced
½ lbs. potatoes, washed and diced
1 cup cottage cheese
3 tbsp. Dijon mustard
1 tbsp. garlic, minced
½ cup dill pickles, diced
¼ cup fresh parsley, chopped
1 tbsp. caraway seeds (optional)
2 tsp. salt
Black pepper to taste

Instructions:

1. Melt butter in sauté pan over medium-high heat. Add onions to pan. Cook for three minutes, then reduce heat to medium. Cook until caramelized, about 25 minutes.
2. Bring water to boil in a medium pot. Add potatoes. Cook until fork tender, about ten minutes.
3. Add cottage cheese, mustard, and garlic to a food processor. Process until smooth, about one minute.
4. Mix all ingredients together. Enjoy!

Serving suggestion: Use salad as a filling for sandwiches. Add a handful of spinach for added flavor and nutrients.

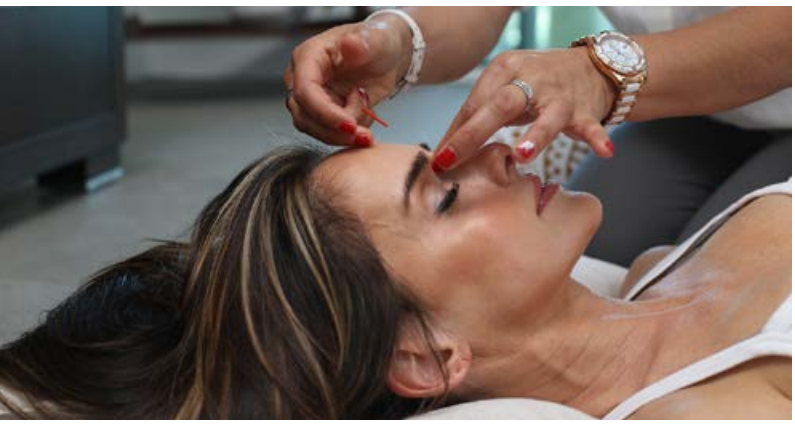
Dysautonomia: Historical Perspectives from Chinese Medicine

DR. AMY AYLA WOLF, DAOM

Chinese medicine (CM) has had a reference frame for understanding dysautonomia for thousands of years. What insights does CM provide — and can acupuncture and Chinese herbal medicine offer any solutions for dysautonomia? As a CM practitioner specializing in concussions, I can say from my experience, the answer is "Yes!"

Chinese medicine is often shrouded in mystery and confusion, with many misconceptions about how it works and what the terminology actually means. In this issue's focus on dysautonomia, I wanted to share the CM perspective, and deconstruct it in a way that makes sense.

A famous book on Chinese medicine theory, "Huang Di Nei Jing," was written in approximately 100 B.C.E. In this ancient book the authors describe a syndrome called a "Ying-Wei Disharmony." *Ying Qi* is a term that is translated as "Nutritive" Qi. Ying Qi is most active at night while people are asleep, and allows for the repair and regeneration of the internal organs and digestive tract. *Wei Qi* is a term that is translated as "Defensive" Qi. It relates to functions of the immune system, and is said to be most active during the daytime. A Ying-Wei Disharmony occurs when the Wei Qi gets stuck in an active state all the time, and the Ying Qi is prevented from circulating at night, preventing the repair and regeneration of the body.



Ying-Wei Disharmonies reflect an imbalance in circadian rhythms, dysfunction of the immune system, and loss of integrity of the digestive system and healthy function of the internal organs. This ancient book includes the following symptoms in its description: heart palpitations, insomnia, numbness and tingling, stomach discomfort, intestinal dysfunction, chronic pain, pressure in the head, poor memory, eye movement disorders, breathing dysfunction, alternating chills and fevers, anxiety and emotional disorders.

What could possibly be going wrong in the body to elicit such a wide array of seemingly disconnected symptoms? What do the following have in common: insomnia, pain, fevers, digestive complaints, anxiety, tachycardia, poor breathing patterns, paresthesias, cognitive deficits, and blurry vision? The answer: the autonomic nervous system.

Today, we have a very clear understanding of the important functions of the autonomic nervous system, including the:

- regulation of heart rate and rhythm,
- breathing and lung function,
- temperature regulation,
- immune regulation,
- sympathetic and parasympathetic balance,
- innervation of the internal organs including the spleen, stomach, and intestines,
- regulation of blood flow to the brain and body, and
- the top-down modulation of pain.

We understand that people with dysautonomia can have a long list of possible symptoms that include:

- brain fog, headaches,
- chronic pain,

- lightheadedness,
- dizziness, nausea,
- rapid fluctuations in body temperature,
- low-level anxiety,
- insomnia,
- digestive dysfunction,
- difficulty breathing,
- numbness and tingling,
- immune dysfunction, and
- exercise intolerance, to name just a few.

It becomes fascinating then that 2,000 years ago, there was a description of a syndrome that matches exactly the same presentation of dysautonomia. Not only was there a theoretical framework for this disorder, there were also treatment strategies involving acupuncture and Chinese herbal medicine to address Ying-Wei Disharmonies.

In my work with patients with concussions, I assess the autonomic nervous system, and often see signs of dysautonomia. I treat these using acupuncture and Chinese herbs. The autonomic nervous system includes cortical areas such as the insula and prefrontal cortex, as well as the thalamus, hypothalamus, and brainstem. Many of the acupuncture points I use, have a modulatory effect on these structures, as observed through neuroscience research and brain imaging. The effects of my treatments are evident in the post-treatment neurological assessments that show better regulation of heart rate, blood pressure, and oxygenation. For example, prior to treatment, a recent patient with a concussion moved from laying down to standing, and her heart rate dropped 6 points. Following acupuncture, she got up from the table, and her heart rate appropriately increased by 6 points. Over the course of the following weeks, her dizziness improved and she no longer was having episodes of poor balance, dizziness, fatigue, and difficulty with speech and cognition.

I have also used Chinese herbal formulas that "Harmonize the Ying and Wei" to successfully treat symptoms of dysautonomia, including insomnia, anxiety, chronic nausea, fluctuating temperatures and dizziness.

Chinese medicine has a long-standing theoretical framework describing dysautonomia, as well as effective treatment strategies that include acupuncture and Chinese herbal medicine. Modern neuroscience researcher Florian Beissner says it best himself in his paper *Effects of Acupuncture on the Autonomic Nervous System: Evidence from Brain Imaging*. "The autonomic nervous system (ANS) controls the majority of organ functions in the human body. It coordinates such central processes as circulation, digestion, metabolism and immune functions. The scientific investigations of acupuncture has long focused on pain, while some of its strongest effects (e.g., on nausea and vomiting, migraine, hypertension, and inflammation) are most likely mediated by the ANS."

Dr. Amy Ayla Wolf is a Doctor of Acupuncture and Oriental Medicine specializing in neurological disorders, concussions and traumatic brain injuries. She is a faculty member of the Carrick Institute of Clinical Neuroscience and Rehabilitation. She teaches courses for healthcare practitioners across the country on neuroanatomy, neurophysiology, functional neurological exam techniques, and neuro-rehabilitation utilizing acupuncture and Chinese medicine. She also offers advanced courses on concussion recovery. Her online courses and additional resources can be accessed at www.acupunctureneurology.com.

Dysautonomia

BY JAMES A. HEUER, PA

Dysautonomia refers to a varied range of conditions that affect the autonomic nervous system (ANS) function. The ANS controls breathing, heart rate, keeps blood pressure steady and many other body functions.

There are roughly fifteen types of Dysautonomia but no single treatment that addresses all the different types. Primary Dysautonomia is typically inherited or caused by a degenerative disease. Secondary Dysautonomia is caused by injury or another condition. Dysautonomia can impact the whole body.

The most common type of Dysautonomia, Neurogenic syncope (fainting) (NCS), affects tens of millions of people worldwide. In the human body, gravity naturally pulls blood downward. During this process a healthy autonomic nervous system will automatically adjust the body's heartbeat and muscles to stop blood from pooling in the lower extremities and will make sure that adequate blood flows to the brain. In NCS the body fails to regulate its internal systems and the result causes the body to faint from the pooling blood and other internal regulator failures, including inadequate blood flow to the brain.

The second most common Dysautonomia is called Postural Orthostatic Tachycardia Syndrome (POTS). POTS typically affects those who already have an autoimmune condition.

"The treatment goal is to reduce symptoms to a level that will allow the person to start strengthening their body, which may include exercise, physical therapy, or even counseling."

Many of the other types share the same prognosis: There is no cure for Primary Dysautonomia. The treatment goal is to reduce symptoms to a level that will allow the person to start strengthening their body, which may include exercise, physical therapy, or even counseling to help manage lifestyle changes. Multiple providers can be involved, including neurologists, cardiologists and functional neurologists.

It is important to understand that dysautonomia is an invisible condition. There is no visual cue, such as a cast or brace, to help loved ones, caregivers, and friends identify and understand dysautonomia.

James A. Heuer, PA is a personal injury attorney helping individuals with TBI after suffering one himself, he practices law in Minneapolis, Minnesota.

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THE ANXIOUS BRAIN

BY JEREMY SCHMOE, DC, DACNB

I'll make this simple: when you injure your brain, you will affect the integration between your brain-gut and gut-brain axis. This can lead to gastrointestinal dysfunction, and it is very common to develop dysautonomia. This can lead to changes in regions of the brain that can cause anxiety for physiological reasons. Changes in autonomics, fuel delivery, blood brain barrier, GI barrier, nutrition and perfusion will lead to instability in regions of the brain, causing anxiety. Various regions of the brain can be injured, which can also lead to dysautonomia due to impaired neurological regulation. Many of the patients we see with dysautonomia have anxiety.

Yes, you read that correctly, there is a physiological reason for your anxious brain! There are changes that have occurred from the initial brain trauma which have most likely affected the frontal cortex, insular cortex, cingulate cortex, amygdala, cerebellum and other regions such as pituitary and hypothalamus that are centrally located in the brain. When injuries occur, instability in any of the above regions can lead to an overall change in function. The good news is that with a very in-depth history, neurological examination, diagnostics, specific therapies, lab testing and nutrition, the right provider can start to unravel the complex web of dysautonomia.

Not only are various regions of the brain affected, but also various cortical networks, hubs and cellular functions. This can lead to instability and impaired communication at the neuronal level. Neurons are firing at rates that they cannot handle, which leads to instability in communication, inflammatory biomarkers being elevated, and the entire metabolic stability of these systems being affected. I like to call this the *chemical soup of brain injury*. There is a chemical component as well as a neurological circuitry component — and these dysfunctions can lead to an anxious brain.

12 Key Players in the Anxious Brain

1. Frontal Connections to the Pontine Nuclei in the brainstem (sympathetic modulation)
2. Insular Hyperactivity (PIVC)
3. Cingulate Cortex
4. Amygdala
5. Cerebellum
6. HPA-Axis
7. Vestibular Nuclei and Visual Systems
8. Vagal Centers
9. Default Mode Network
10. Chronic Pain Loops
11. Neuro-inflammation
12. Microglial Priming

Frontal-Pontine Connections

When you injure the frontal connections to the pontine regions of the brainstem, this can lead to an impaired modulation of the sympathetic nervous system — which can further lead to sensitization and chronic pain. This pain may not only be in your gut, but throughout the body, and can in turn cause more anxiety!

When you are in pain, this is going to sensitize various limbic regions in the brain, a.k.a. the emotional centers. The frontal lobe is involved in modulation of the limbic regions in the brain such as the cingulate and amygdala. These regions reflexively respond to sensory stimulation in the environment, and without the frontal lobe modulating these regions, sensory stimuli such as visual motion, sound and movements can lead to feelings of anxiety and emotionality.

These regions in the brain are already hyperactive, leading to an impaired modulation of pain. A feedback

loop from the painful regions in the body will lead to more instability centrally, further leading to more anxiety. It is a viscous loop that is hard to get out of. Seeing a functional neurology provider trained in assessing all things neurological, metabolic and structural, as well as working with other techniques such as CBT, hypnosis and EMDR, have been very helpful for many of my patients.

Parietal Insular Vestibular Cortex (PIVC)

The Insular cortex is a region very deep in the brain that is involved in the interoceptive processing of your inner and outer self, emotional regulation, body homeostasis and many other functions. There are connections between the parietal lobe, insula and vestibular system in the cortex called PIVC. Many patients that I have seen who have changes in central vestibular function also have anxiety, depersonalization and emotional instability. We have seen that by performing a variety of neuro-therapies we can improve anxiety in our patients. The normatec compression boots provide feedback from one's vasculature in his or her lower extremities. Other therapies such as listening to one's own heartbeat, specific breathing techniques, vestibular rehabilitation, Gyrostim and tilt-table therapy have shown clinical promise in improving autonomic function as well as emotional regulation.

Cerebellum

Another key region involved clinically in many of our patients is the cerebellum. When the cerebellum is compromised, it can lead to poor balance, gait ataxia, midline instability, and trouble with coordination of movements. These include both eye movements and modulating vestibular function. Clinically we have seen that when the cerebellum has impaired gaiting, this can lead to overstimulation in regions of the brain. This can lead to anything ranging from anxiety, irritability, emotional reactivity, insomnia due to racing thoughts, blood pressure changes, and dysautonomia. By performing various movements with the body, eye exercises, vestibular rehabilitation, Gyrostim therapy, along with manual techniques, we can improve cerebellar function. By improving the cerebellum, you see changes in brainstem activation. The brainstem modulates autonomic function, which can improve anxiety.

The Visual and Vestibular System

Brain trauma can destabilize the visual world around us and affect our ability to know where we are in space in relation to objects around us. This system can affect our head and neck positioning, posture, and balance, as well as overall cognitive functioning. To make things simple — if the visual system is affected, there can be symptoms noted that seem to be non-related to vision. A large percentage of the visual pathways integrate into reflexive systems along with autonomic systems. They also have integration with the vestibular system, auditory system and even the proprioceptive system. Many patients we see who have dysfunction in these pathways develop dysautonomia from impaired sensory integration and mapping of where to push blood to in the body and brain through fuel delivery.

To have a stable, accurate visual world, it is also imperative that the integration between these systems is fine-tuned and coherent, allowing for vision to be dynamic, flexible and adaptable with changes in sensory input that we have to deal with on a day-to-day basis. When these systems are not fine-tuned, this leads to a massive use of energy that takes away from higher-level cognitive processing.

Eye Movements

An example would be dysfunction in pursuit eye movements. Pursuit eye movements are the type of movements that allow the eyes to follow a moving target. The circuitry is complex and involves the brain stem, cerebellum and cerebral hemispheres. An area involved in the brain stem is the neural integrator that includes the NPH and the medial vestibular nuclei. The medial vestibular nuclei integrates with the cerebellum and the peripheral vestibular structures.

If neuro-vision therapy with pursuit exercises is not fully integrating these movements back to recovery, then utilizing the proprioceptive system and combining a body-based movement with activation of the spinal musculature with vestibular ocular exercises could be enough to drive plasticity in the brainstem. These therapies can help improve the gain of pursuits, decrease saccadic intrusions reducing retinal slip, and improve the pathology.

Having an in-depth understanding of the neuro-circuitry is what allows the functional neurology provider to make improvements in symptoms. The visual system is so complex with its integration with other sensory systems. This integration occurs to allow us to know where we are

"The good news is that with a very in-depth history ... the right provider can start to unravel the complex web of dysautonomia."

in space, which affects body positioning and motor output. This integration translates into maps of ourselves internally to allow us to shunt blood to regions that needs it.

The aspects of dysautonomia, if left unaddressed after injury, could be the missing piece to recovery.

Vagus Nerve

The communication between higher cortical centers and lower brainstem can be affected by TBI. The vagus nerve helps to regulate your autonomics and has parasympathetic control over your GI system. The vagal regions of the brain are very important for overall wellbeing and balance in your autonomic nervous system. Various techniques are used by a functional neurology provider to stimulate the vagal nerve, which in turn helps to dampen inflammation in the body and modulate the brain's immune system. It does this through switching off primed microglial cells that can be turned on after TBI. When there is an imbalance between the sympathetic and parasympathetic systems, dysautonomia can develop.

Default Mode Network

Default Mode Network is compromised from multiple regions of the brain and is the primary resting-state network in the brain. Research has shown hyper connectivity in this network of the brain. These regions are involved in memory, executive function and attention. The hyper-connectivity in this network could explain the inability to disengage the network and switch task demands, explaining the cognitive deficits seen in concussion.

This hyper-connectivity could also explain the inability to get into resting-state mode that could lead to anxiety, racing thoughts, and an inability to utilize higher cortical centers in the frontal lobe to modulate autonomics and limbic regions of the brain.

Neuro-Inflammation and Microglial Cells

A large percentage of the brain is made up of immune cells called glial that outnumber the neurons 10 to 1. These glial cells are affected with TBI, and in healthy brains they help remove plaque and debris, and support healthy communication between neurons. When you injure your brain, this can lead to microglial cells being switched on and ramified, leading to excessive damage to neurons.

Neurological stimulation from specific exercises, brain-based nutrition, and modulating the immune and gut health, can be very important in addressing brain-based inflammation. Any of these could be leading to instability in various regions of the brainstem that have receptors for inflammatory cytokines. This instability can be a contributing factor in dysautonomia.

In addition to brain injuries, there may even be underlying co-morbid factors involved prior to the patient hitting his head. These may set the stage for brain inflammation, such as autoimmunity, infections, diabetes, food intolerances, excessive alcohol use, leaky gut, hormonal imbalances or pre-existing anxiety/depression.

Putting It All Together

Seeing a functional neurology provider who has the ability to address structural, neurological and metabolic integrity can help many factors involved in the anxious dysautonomic-inflamed brain. This is because when you injure your brain, there will be changes in the functional ability to activate regions that stabilize the autonomic nervous system. Just a reminder that your autonomics are out of balance with anxiety and dysautonomia.

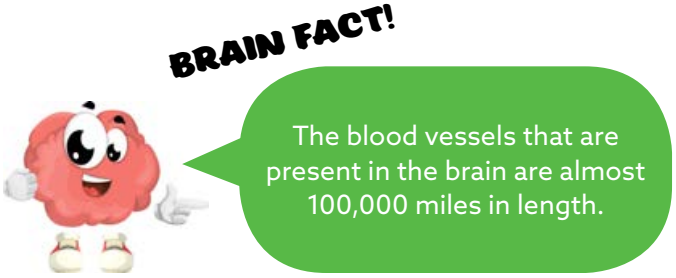
When the brain is injured, there can be a tipping into more of a sympathetic mode. This can lead to sensitization of pain structures, GI motility, leaky gut and or changes in peripheral and central inflammatory pathways. Any of these can prime regions of the brain that are involved in anxiety. Neurological networks such as default mode and hubs such as the cerebellum, brainstem, vestibular nuclei and regions of the brain involved with vision are affected, impairing the person's ability to know where he is in space.

This can activate reflexive limbic and autonomic responses leading to anxiety. The brain's ability to activate the brainstem's vagal centers to modulate the sympathetic nervous system is affected, leading to dysautonomia.

Please remember many of the feelings you are experiencing are real — and that it's just not all in your head.

From my experience, we are able to make improvements in anxiety and dysautonomia with functional neurology rehabilitation provided in an intensive neuro-recovery program.

Dr. Jeremy Schmoe, DC, DACNB is the founder and director of The Functional Neurology Center in Minnetonka, MN and works with complex neurological cases from all over the world. www.theFNC.com



Unique Symptoms of Dysautonomia

BY KELLIE POKRIFKA

Throughout this issue, we have discovered the basis for dysautonomia. Now let's talk about the myriad of ways in which dysautonomia can present itself after brain injury. Note that there are numerous forms of dysautonomia and that each condition can present with different symptoms. To further complicate the diagnosis, each patient can have a unique set of symptoms.

1. **Temperature Dysregulation** — Have you ever noticed you are now constantly cold or always hot? Note that the dysregulation can go both ways, so at one moment you may feel warmer than everyone else in the room, and quickly after, you may feel cooler than everyone else. Keeping a stable, comfortable temperature is an important function that may be compromised due to dysautonomia.

2. **Sweating/Sudomotor Dysfunction** — An interesting aspect of dysautonomia is its affect on sweating. Some patients have a reduced ability to sweat, which leads quickly to overheating. Some patients notice they are sweating far more than usual. However, if you are considering this aspect, know that many medications prescribed after brain injury can also have over-sweating effects. For example, certain antidepressants and migraine medications can improperly control sweat rates.

3. **Heart Rate Variability** — One of the classic symptoms of dysautonomia is its effects on heart rate. Many patients will find their heart is racing when they are sedentary. Maintaining an increased heart rate when it is not necessary is exhausting to the body. The "tired and wired" feeling of the "fight-or-flight" sympathetic firing is very obvious with this symptom.

4. **Blood Pressure Dysregulation** — Have you noticed dizziness or fainting when you get up after sitting or lying down for an extended period? Do you now become lightheaded if you are just standing for a short period of time? Dysautonomia frequently presents itself with poor regulation of blood pressure, which can lead to dizziness or syncope.

5. **Pupil Dilation** — Dilated pupils indicate sympathetic firing. This can often occur with heightened pain levels. Dysautonomia can skew these levels into dilating improperly without a stimulus.

6. **Gastroparesis** — This is a lack of motion in the muscles used in digestion. The stomach cannot properly move, digest, and empty the food. This can be easily seen if you vomit hours after a meal, and there is still undigested food visible. Gastroparesis can lead to dehydration and malnutrition. Many other gastrointestinal disorders can also arise as a result of dysautonomia, including irritable bowel, constipation, diarrhea, and many others.

7. **Erectile Dysfunction** — The difficulty or inability to get or keep an erection can result from dysautonomia.

These are just a few of the symptoms of dysautonomia. As this condition covers any autonomic process, the presentations are near limitless. In addition, each patient may have a unique cluster of symptoms. Talk with your doctor to see if your set of symptoms may have a basis in dysautonomia.

Kellie is a TBI survivor and works as an intermediary between the experts and the patients with brain injuries.

What You Need to Know About Service Dogs

BY TONI POPKIN

With 23 states having laws against the use of fake service dogs, it's important to understand what a service dog *is*.

The American Disability Act (ADA) clearly defines a **service dog** as follows: "A service dog is specifically task-trained to help an individual with a disability that substantially limits one or more life activities. Disabilities may include visual difficulties, hearing impairments, Post-Traumatic Stress Disorder (PTSD), seizures, ambulatory issues, mental illness, diabetes, autism, and more, depending upon the applicable law. However, to qualify, the task(s) must be related directly to assisting with the individual's disability — not basic obedience, owner protection or pet tricks. Emotional support and comfort are not trained tasks. 'Natural' alerts or 'spontaneous abilities' do not qualify as trained tasks."

- **Service dogs are NOT PETS** — They are fully trained to do specific tasks to assist one person who has a disability; they have been exposed to numerous situations a pet would not be exposed to and have learned to be non-reactive in these situations. In addition, they have hours of working in the public in all types of situations including things such as leaving food alone when lying quietly on the floor in a restaurant; to walk in a grocery store or shopping center focusing only on their partner, ignoring other people, dogs, smells; or to ride public transportation if they need to with their partner. They are frequently exposed to everyday real-life situations, becoming comfortable in them, quiet in public, and able to adapt to going anywhere with their partner. It takes a lot of hard work and dedication to make a successful service dog team.

- **There's NO SUCH THING as a certified or registered service dog** — Some programs that train and place service dogs will test them for public access, but this does not mean a service dog is certified or registered.

- **Watch out for scams** — Online scam sites SELL papers, vests, IDs, etc. to show that your pet is "certified" or "registered." You spent money to make your pet a "pretend service dog," or it shows that you don't know the difference.

- **Emotional support animals (ESA) are PETS** — They are not specially trained to do anything; they just make you feel better. These dogs cannot go to any non-dog friendly establishment. Taking them in public wearing a vest causes problems: 1) They are not trained to ignore other dogs, and many service dogs have been attacked by them. 2) This now gives businesses a chance to question any trained service dog due to seeing behavioral problems with these pets. 3) They have not been exposed to many of the stimuli in the public like loud noises, smells, crowds, and become reactive. In many states it's now illegal to take a pet in public

"For people with disabilities, having a specially trained service dog plays a vital role in their everyday life. They make it possible to work, travel, and stay safe."

pretending it's a service dog. That's what a person is doing by putting a vest on a pet no matter what it says or by showing a business a bogus ID or papers showing your pet is registered or certified.

To truly qualify for an ESA you 1) have a diagnosed mental condition as listed in the DSM-V; 2) have updated documentation from your treating mental health professional on the letterhead of stating you are under his/her care, have such diagnosis, are in need of an ESA for your mental health or treatment, signed, dated, license number, state, and what type of mental health provider the person is. If you don't have a mental illness, why do you think it's okay to pretend?

- **Therapy dogs are different than either service dogs or ESAs** — Tested for temperament, they must be invited to visit groups where they can offer hugs, love, and be petted, like nursing homes, hospitals, rehab facilities, schools, and libraries. You have no public access to any other places with them.

Why Is All of This Important?

The state laws make it illegal to falsely claim that you are entitled to be accompanied by a service dog. In some states, it's illegal to falsely misrepresent that your pet or other animal is a service animal (putting your dog in a "guide dog" or "service dog" vest).

For people with disabilities, having a specially trained service dog plays a vital role in their everyday life. They make it possible to work, travel, and stay safe. By falsely claiming your pet as a service dog in order to bring it with you wherever you go, you are not only inconveniencing those who have to put up with your ill-behaved pet, you are also tainting the view of the general public. Service dogs already have to go through a lot of hoops to garner the respect they deserve, but with so many people falsely bringing their untrained pets into public places where they don't belong, they jeopardize the safety of the service animal and their owner.

Toni, along with her Service Dog Bud, live in Alexandria, Virginia, where she advocates and educates about Service Dogs and about people like herself who have a TBI.

Conquering Education After Brain Injury

BY KELLIE POKRIFKA

Pursuing education is a deeply personal and individualized matter. The journey of every single student is unique. Following a brain injury, these differences are even more pronounced. Learning to accept your journey without comparison to others is critical. If we can achieve this, we become our own advocates versus just another obstacle.

Here are a few ways we can be our own best advocates to help us succeed in returning to school after brain injury:

- **Get an IEP in place before returning to school** — About 1 million children sustain a TBI each year. Only 438, or .25% (less than one percent!) of these kids will receive an IEP, or special education plan. This lack of identification and accommodation leads to drastic inequalities and disadvantages. The dropout rate of those with learning disabilities, including those resulting from brain injury, *is **triple** that of the average student*. Not only do you morally deserve accommodations, you legally deserve them. It is your legal right to have equal access to public education.

- **Complete neuropsychological testing** — Neuropsychologists can help identify specific learning deficits and can provide a wide range of strategies to help offset these difficulties. Identifying specific difficulties helps to identify specific solutions. This added help can drastically pay off. Consider your neuropsychologist your coach for going back to school.

- **Utilize computer-assisted learning** — Take advantage of what technology has to offer. Textbooks can be converted with text-to-speech software. Lectures can be recorded. PowerPoint slides can be printed off prior to that lecture. All of these steps can help decrease the possibility of overstimulation and depletion of our cognitive reserve.

- **Implement the Pomodoro Technique** — This strategy is also used to prevent neurofatigue and overstimulation. It uses timed intervals to give "brain breaks." The standard protocol states that for every 20 minutes spent studying, a 5-minute resting period is required. However, these numbers will need to be individualized for each student.

- **Schedule classes appropriately** — Many schools tend to adopt strict attendance policies. However, these policies are not designed for students with disabilities. Work closely with the school (disabilities office, guidance counselor, principal, teacher, etc.) to design a policy that will actually benefit the student. Consider your specific needs. Are your symptoms worse in the mornings? Schedule afternoon classes. Can classes be scheduled every other day so that there is ample time off for rest and doctors' appointments? Education is difficult enough without having to fight against our own bodies.

- **Be confident in your advocacy** — *Brain injury really forces you to learn how to advocate for yourself.* We

need to advocate to our doctors to take our health seriously. We need to advocate to society to treat us with respect. And we certainly need to advocate to our schools to support us and provide proper accessibility. This process is extremely challenging. It can be a disheartening and demoralizing process. Keep your confidence throughout this process. Remember that regardless of how your message is received, you deserve these accommodations. You deserve this respect. Nothing is more important than your health, and nobody knows your own needs better than you do.

Kellie is a TBI survivor and works as an intermediary between the experts and the patients with brain injuries.

The Importance of Voting

BY ZACK EICHTEN

"Our lives begin to end the day we become silent about things that matter" — Martin Luther King Jr.

It's a new year, and the year 2020 will bring about a consequential election for the Presidency, House of Representatives, Senate, and state legislatures across the county.

I know, I know, people don't like to talk about politics, but the truth is our lives are impacted a lot by policymakers at all levels. The decisions made in state legislatures, Congress, and the executive branch has direct impact on many of the programs people with disabilities rely on in order to survive. It is incredibly important to elect people who will represent your values into the offices that make these decisions related to improving the lives of the disability community. The Democratic primary is currently happening, and even though many states have cancelled their primary, the GOP has a presidential primary as well.

IMPORTANT: Regardless of which party you want to vote in, I encourage you to look up more information on the candidates' policy positions. There is diversity of positions on many issues that may be important to you across the primary field.

Later, many states will hold additional primaries for other offices. I encourage you to vote in these local primaries as well. These are *just as* important as a vote in the presidential primary. **These local legislators are the ones that have the most concrete influence on programs that people with disabilities rely on.**

Finally, voting in the election come November 2020 is ***critical***. Many states have options to vote from home, vote early, or have other accommodations for people with disabilities to make voting accessible. If you have questions about your state's accommodations, call your Secretary of State's office, and they will be able to get you information on how to vote that is accessible for you.

We see politics everywhere. It is on the news, on Facebook and Twitter, at family gatherings, and also in our day-to-day life. It can get exhausting trying to keep up with the information every single day. This is the cost of a democracy. Democracy requires citizens to participate — or else the system falls apart. As we approach primary season, and the following election season, I encourage you to vote for the candidate that embodies your values. Voting, and participating, is the very bedrock of our society. Don't squander your chance to improve the world.

Zack Eichten is a Public Policy Associate at the Minnesota Brain Injury Alliance and a Direct Lobbyist.

Managing Stress with Plants

**BY SUE WILSON,
MA, ATC/L, PES, CHHC**

One chemical element *is essential* to the functioning of the human body. Oxygen is a colorless, odorless reactive gas, atomic number 8 — and is life supporting. Perhaps the most critical thing about oxygen is that it is life supporting. Every cell in the human body needs oxygen at some point to survive. When oxygen is depleted in the body due to an illness or injury, the body's cellular structure starts to adapt its functioning, resulting in lasting signs and symptoms.

Oxygen forms about 20 percent of the earth's atmosphere and is the most abundant element in the earth's crust. According to the Environmental Protection Agency, Americans spend an estimated 90 percent of their time indoors. This becomes especially true if people are struggling with noise and light sensitivity, fear of falling, and also emotional instability, all caused by a TBI.

More disturbing is the fact that the air inside of office buildings, homes, schools, and apartment complexes can contain 10 times more pollution than outdoor air. This is a consequence of toxic emissions from building materials, airborne mold, viruses, toxic cleaning supplies, chemically induced lawn care, and poor filtered water.

The brain needs new and fresh oxygen to help repair the body's cellular structure and improve daily functions. After a TBI, the damage in the brain creates a lower oxygen profile that can present itself as poor memory, decrease cognitive function, and emotions such as rage, anger, sadness, anxiety and depression. The body can feel constant headaches, triggers for migraines and the inability to think as fast as it once could.

Many of the signs and symptoms listed above can create an enormous amount of stress on the survivor or caregiver. *Stress management* is a critical component in the overall healing of the body because a significant amount of stress on the body creates chaos. Stress is felt in every organ of the body, every blood vessel that must constrict and dilate, and every cell that must balance minerals and vitamins.

One simple and inexpensive way to help calm the brain to better manage stress in the body is to purchase some indoor plants. Certain plants can powerfully help oxygenate the air inside your home, and the body can pull the oxygen into the cells. The more fresh and powerful oxygen we have in our cells, the more effectively our body can handle stress and eliminate the bad and absorb the good.

The world's largest oxygenating plant is called the Snake Plant, also known as Mother-In-Law's Tongue (very interesting if you are married!!). The snake plant can convert a lot of CO2 (carbon dioxide) to good healthy O2 (oxygen) at night while we sleep. The more oxygen our body can pull into its cells while we sleep, the better quality of sleep we will receive. Sleep is also a critical component to stress management. For best results with a snake plant, place it in the bedroom.

The Boston Fern (Nephrolepis exaltata) is a wonderful indoor plant to help decrease stress because it helps neutralize the harmful chemicals in the air that create stress in the body. The Boston Fern removes formaldehyde, xylene, and toluene from the air and thrives in moderate, indirect sunlight and can handle high humidity. This plant is great for hanging in a basket or planter on a top bookshelf in an office or living room.

Pothos (Epipremnum aureum) removes toxic chemicals from our air like benzene, formaldehyde, xylene and toluene. It thrives in moderate-to-low indirect sunlight so perfect for the basement bedrooms and has also been named the "cubicle plant" for its ability to grow in less-than-ideal environments. A great choice for those who need more brain oxygen—and tend to kill most plants.

Last, but not least, the Peace Lily (Spathiphyllum 'Mauna Loa') removes all the above toxins from the air and thrives on moderate-to-low indirect sunlight. It is identifiable by its beautiful signature dark green leaves and while "flowers" that are called leaf bracts.

Do some of your own research on powerful oxygenating indoor plants. Pick out the plant that you like best and purchase one for your home, office, basement, or bedroom today. After researching and writing this piece, I think I will be buying a plant for each of my daughter's bedrooms to help promote restful and dreamy sleep.

Life Lessons Learned from a TBI

AMY ZELLMER, EDITOR-IN-CHIEF

As we put up a new calendar to celebrate a new year, I hope you take a moment to reflect on all the amazing things that happened in 2019.

One of the lessons I have learned is that it's sometimes hard to realize all that is going right in our world when we are often feeling overwhelmed, fatigued, and frustrated. By reflecting on the past year and writing down all the great things that happened, it can help remind you that while this journey can be challenging, it does have its bright moments. The seemingly littlest things can be the biggest accomplishments when you have a brain injury, and you should celebrate them.

Learning to accept our "new normal" can be hard, and the grieving process can be long. But know that there really is light at the end of the tunnel, and while you may not be exactly who you were before brain injury, *the new version doesn't have to be a negative*. The new you has the ability to choose where you wish to go in life, and you get to make the choice of what you do now. Whether it's becoming an advocate or just giving yourself the self-care you need, you can empower yourself to be more than you were before.

For me, it took about a year to mourn the old me and understand why this had happened to me. Once I shifted my mindset and put on my big girl panties, I understood what I needed to do. It was my passion to help others so they did not have to struggle as long as I did to find the proper resources — and to not feel so isolated and alone in their journey.

My journey of helping others is a far greater mission than whatever path I had been on prior to my injury. While being a photographer was a fulfilling career, I didn't necessarily feel I was making a difference in the world. So in many ways I feel my injury was a blessing. It has put me on a path of passion-driven purpose, and one that I know is helping others.

The moral of the story: Take whatever time you need to grieve, but know that you are perfect just the way you are. While you may not be able to do all the things you once did, you have abilities and passions that can take you further in life than you ever dreamed possible.

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