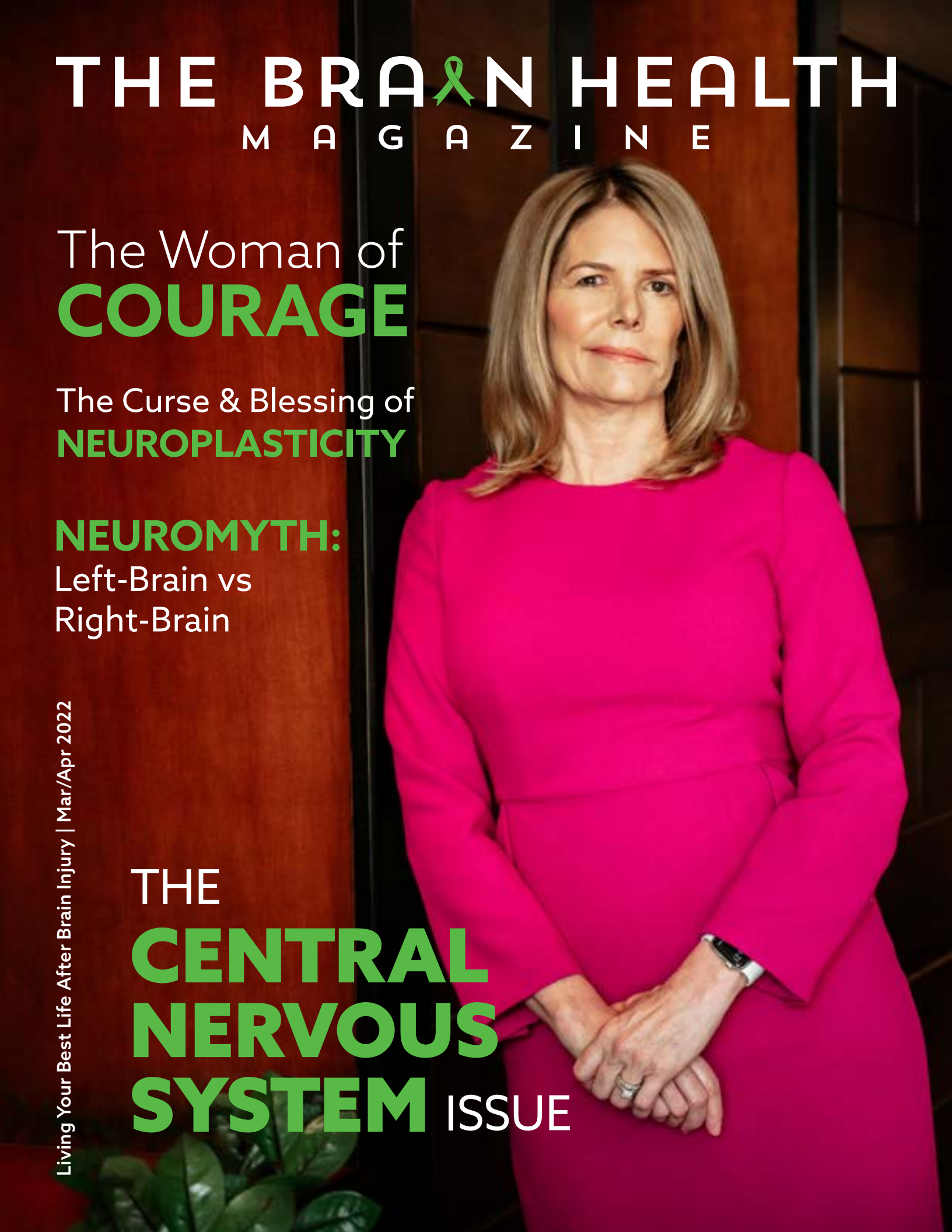
THE BRAIN HEALTH MAGAZINE



The Woman of COURAGE

The Curse & Blessing of NEUROPLASTICITY

NEUROMYTH: Left-Brain vs Right-Brain

THE CENTRAL NERVOUS SYSTEM ISSUE

Living Your Best Life After Brain Injury | Mar/Apr 2022

THE BRAIN HEALTH MAGAZINE

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EDITOR-IN-CHIEF
Amy Zellmer

GRAPHIC DESIGNER
Heide Woodworth

COPY EDITORS
Lynn Garthwaite
Ian Hebeisen
Claudette Hegel

CONTRIBUTORS
Kristen Brown
Jonathan Chung, DC
Ellen Fortini Courtad
Kelly Harrigan
Ian Hebeisen
James A. Heuer, PA
Dr. Amy Lawson Moore
Dr. Shane Steadman, DC, DACNB, DCBCN, CNS
Deborah Zelinsky, OD
Amy Zellmer

EDITORIAL BOARD
Emily Acers
Carrie Collins-Fadell
Lynn Garthwaite
Rebecca Quinn
Heide Woodworth

PHOTOGRAPHY
Jennica E. Maes
Amy Zellmer

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FROM THE EDITOR

Every year as March approaches, I am grateful for the opportunity to participate in Brain Injury Awareness Month at the nation's capitol. However, with the pandemic, we are once again unable to gather in Washington, DC.

This led me to create a virtual brain injury awareness day event via Zoom … this will be my second year hosting this free event for survivors, caregivers, and professionals alike.

Save the date for March 16th from 10 a.m. – 4 p.m. CST, and plan to join us to hear from an incredible lineup of speakers. You can register for free: www.facesoftbi.com/event

BRAIN INJURY AWARENESS DAY

March 16th, 10 a.m. – 4 p.m. CST
Plan to join us to hear from an incredible lineup of speakers. You can register for free: ***www.facesoftbi.com/event***

This issue is packed full of helpful information about the central nervous system. After a brain injury, you may often notice you are constantly stuck in "fight or flight" mode, although you may not realize what that is. You may notice symptoms including sound sensitivity, startle reflex, fatigue, sleep problems, easy overwhelm, shaking, anxiety, and gut issues.

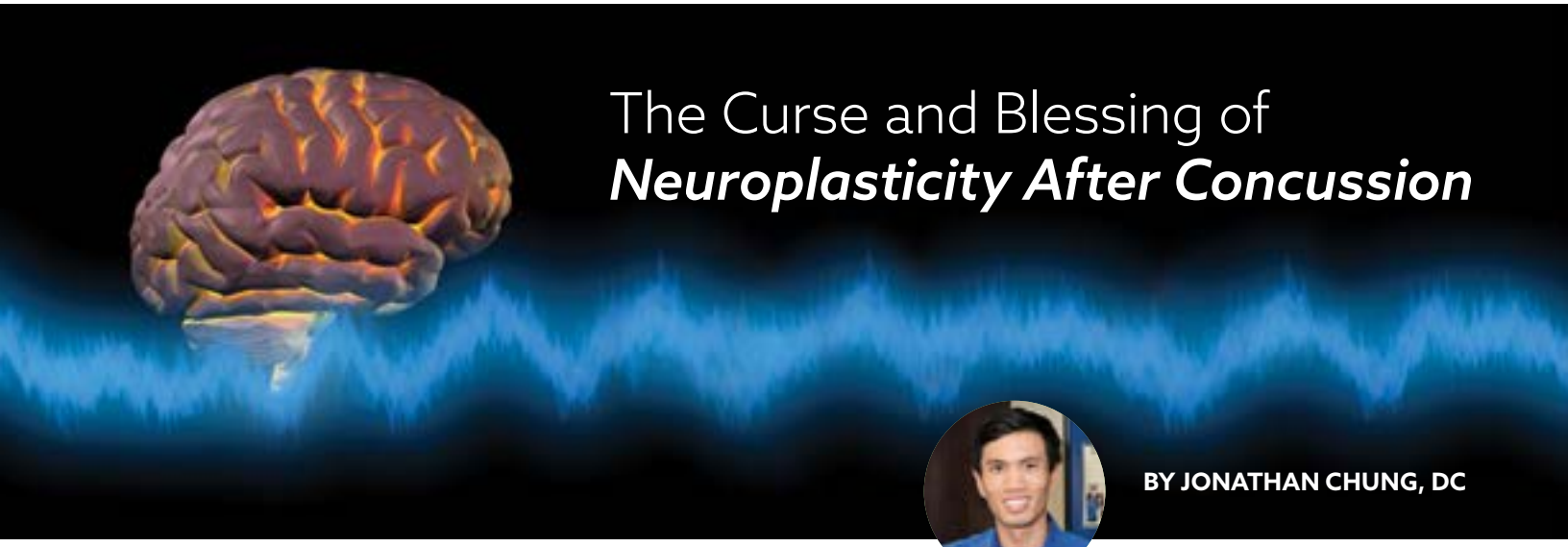
When you're stuck in "fight or flight" mode, relaxing or focusing may seem impossible. Our body's natural reaction to unexpected stimuli is to go on-guard to protect us … which includes conserving energy and sending blood flow to our extremities. Our body releases cortisol (a stress hormone), and we get stuck in this cycle, unable to turn it off and go back into "rest and digest" mode.

The problem is our bodies aren't meant to stay in "fight or flight" mode, which can completely disrupt our daily life. We often don't understand why we feel the way we do.

The good news is the issue is treatable with the correct therapies. Functional neurology is a great place to start, as traditional doctors sometimes don't understand the complexity of our nervous system and how brain injury affects it.

My hope is the articles in this issue will help inspire you, and maybe even give you the nudge you need to seek proper treatment from a professional who truly understands how to help you.

AMY ZELLMER, EDITOR-IN-CHIEF
@amyzellmer



The Curse and Blessing of *Neuroplasticity After Concussion*

BY JONATHAN CHUNG, DC

Neuroplasticity is defined as the ability for neural networks in the brain to change through growth and reorganization. If you've been involved in the world of strokes and brain injuries long enough, you probably heard of neuroplasticity in the context of how it can provide hope for people to rehabilitate and recover from their condition. It's a major reason why I put the word "Neuroplasticity" into the name of my clinic!

However, at a very basic level, neuroplasticity simply means the central nervous system can change through learning. For the most part, the behaviors our brains learn are useful or helpful to us. This happens when our brains learn how to properly perform an exercise, learn new skills for work/school, develop social intelligence, or even learn how to cope with stress. But in the same way we learn things that become a net positive for our lives, our brains may also learn behaviors that can be detrimental. This can be something benign like a little bit of procrastination, or it can be more serious behavior leading to addiction or abuse.

So what does this mean for the ailing brain after concussion?

In the acute phase of injury, physical and biochemical processes lead to the death of neurons or disruption of pathways in the brain. During this time, our ability to perform specific tasks becomes compromised because we lose access to the parts of the brain responsible for those behaviors.

While all brain injuries and concussions are serious, most concussions don't create widespread death of most of the neurons in our brain. In addition, our brains have a lot of redundancy, meaning we have lots of neurons and pathways in our brains that perform similar jobs. That means if we receive a physical injury to parts of our brain, plasticity allows other parts of the brain to perform the same job. After the immediate injury, our brains start working hard to form new synapses and build new connections to bypass the injured pathways.

> **"After the immediate injury, our brains start working hard to form new synapses and build new connections to bypass the injured pathways."**

If this process works well, you have a good chance of recovering from a concussion with seemingly few symptoms or consequences. This may be why many studies show that upwards of 80-85% of concussion patients recover on their own, because plasticity worked in their favor.

But what happens to the 15-20% who struggle after their symptoms? A concussion patient can have persistent symptoms for many reasons. Some patients receive injuries outside the brain contributing to dysfunction (neck and vestibular injuries). Patients with some pre-existing conditions are susceptible to longer recovery (migraine and anxiety). But there is also a case to be made that many patients may experience neuroplastic changes in their nervous system that actually worsen the patient's symptoms.

One key example of this is found in a phenomenon called central sensitization. Central sensitization is a condition that can cause chronic pain symptoms after injury. Immediately after an injury, your nervous system may make your nerves or your spinal cord more sensitive to pain as a way to protect it from further injury. This sensitivity should go away as the injury heals, but patients with central sensitization will have areas of their spinal cord going through neuroplastic changes that cause the sensitivity to persist long after the injury heals. So instead of a painful stimulus causing pain, the neurons in the spinal cord learned a maladaptive pattern causing normal

sensation to trigger pain. Some researchers believe this may be a mechanism for how some concussion patients develop chronic pain or persistent headache long after a concussion occurs.

> "[P]atients with central sensitization will have areas of their spinal cord going through neuroplastic changes that cause the sensitivity to persist long after the injury heals."

Negative plasticity may explain other post-concussive symptoms. Some patients after concussion learn to compensate for loss of balance by learning subtle changes in how they walk and maintain balance. While these subtle changes in balance help in the short term, these new compensations may not be ideal for sport and activity and may cause higher rates of lower body injuries. Negative plasticity may also be a reason why some post-concussion patients experience persistent tightness or spasm of different muscles after injury, which can contribute to movement disorders.

> "Negative plasticity may also be a reason why some post-concussion patients experience persistent tightness or spasm of different muscles after injury, which can contribute to movement disorders."

The brain didn't intentionally create these negative adaptations, but simply did its best to cope with an injury to a really important part of the body. In the process of creating new connections that are supposed to be helpful, sometimes wires get crossed and things don't go as planned. At the end of the day, while plasticity is intended to help, the truth is that plasticity sometimes gets in the way.

What Does this Mean for Recovery?

This article might feel like a lot of doom and gloom, but there's a bright side to all of this. The most important thing to know about plasticity is that the brain can change throughout our entire lives!

At one time, people believed our brains didn't change as we got older. People also once believed having persistent symptoms after a concussion for over a year meant they had little hope of getting better.

> "The most important thing to know about plasticity is that the brain can change throughout our entire lives!"

In the world of neurorehabilitation, clinicians use principles of neuroplasticity to change the brains of injured patients, regardless of age or length of injury. Research shows therapeutic applications for cardiovascular exercise and resistance training helps the brain produce chemicals called brain derived neurotropic factors (BDNF) that increase brain plasticity. Engineers continue to develop tools for non-invasive neuromodulation like vagus nerve stimulators and tongue stimulators, which show promising results in increasing the speed of plasticity in patients with stroke or multiple sclerosis.

In the world of functional neurology, we use these principles and tools to identify harmful plasticity, and how to harness these tools to use neuroplasticity in a personalized way for recovery.

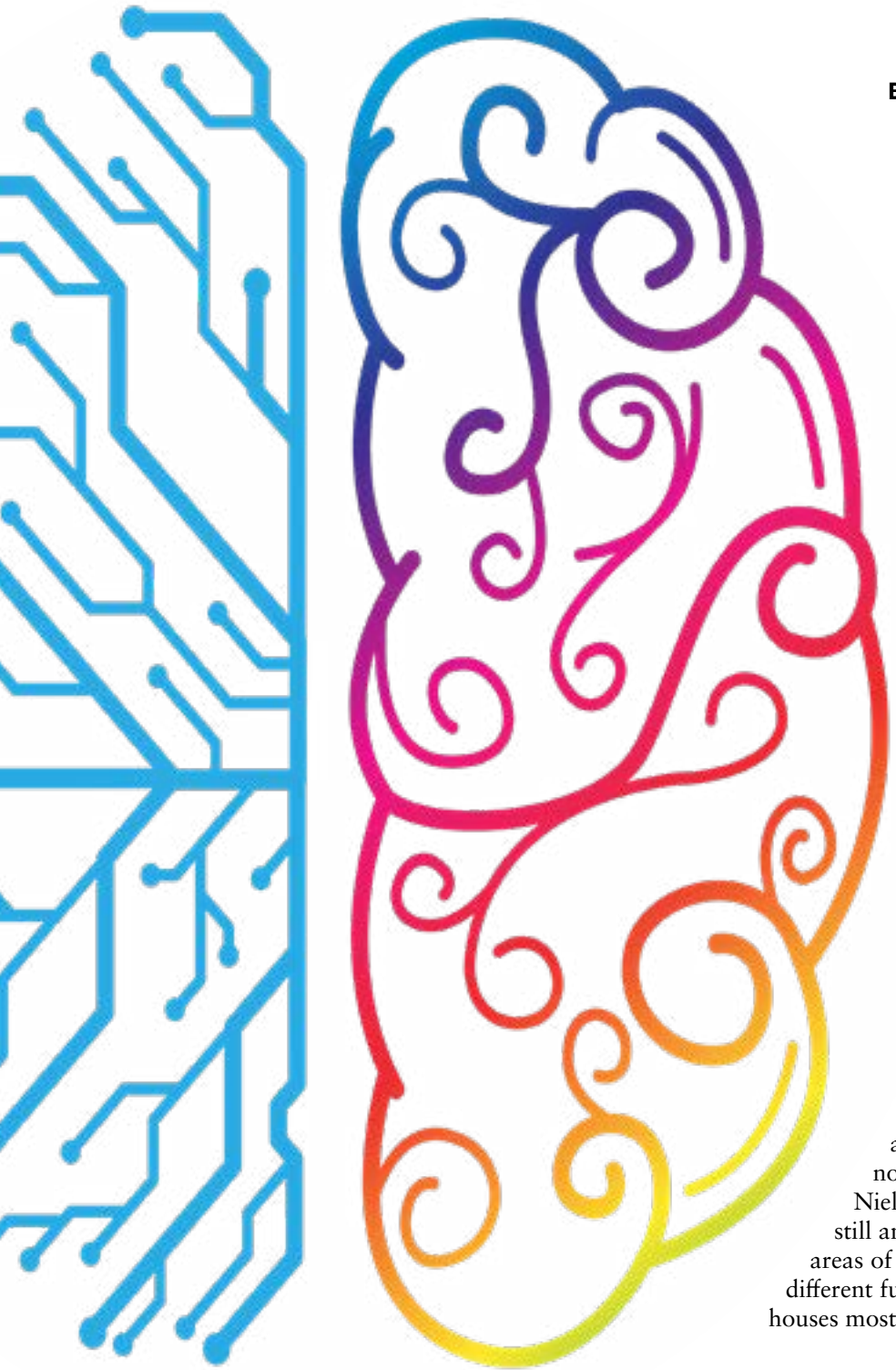
But neuroplasticity isn't something exclusive to a clinic. We can all harness neuroplasticity ourselves in our day-to-day lives. We can harness plasticity every time we exercise, whenever we learn a new way to slow down our breath, and when we practice mindfulness. We can harness plasticity whenever we develop greater consciousness of the thoughts and actions that may fracture relationships and slow down our instinct to be reactive.

Achieving plasticity is hard. It is difficult. It takes a lot of practice and work, and not everyone will succeed, especially the first few times you try. But like anything else worth having, a strong amount of social support and dedicated effort to persist through failure can stack the deck in your favor for the ever-changing brain.

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***

BUSTING THE NEUROMYTH

of ***Left-Brain*** Versus ***Right-Brain*** Dominance



BY DR. AMY MOORE

I remember calling myself a "right-brained thinker" in college, because I was creative, musical, highly emotional, and full of big-picture, out-of-the-box-ideas. I struggled to relate to classmates who enjoyed math. They were polar opposite, left-brainers who analyzed everything. Imagine my surprise in graduate school when I found myself truly enjoying my research methods and statistics courses. That just didn't line up with my right-brained persona. I began studying the research on hemispheric domination, the idea that some people are right-brained, creative thinkers, while others are left-brained, analytical thinkers. I discovered this belief in hemispheric domination to be incredibly pervasive, but simply not grounded in science.

What does science say about left-brain versus right-brain dominance?

The research on hemispheric domination doesn't support the theory of left-brain versus right-brain personality or learning style. In a fascinating study of more than 1000 brains using functional magnetic resonance imaging (fMRI), Nielsen and his colleagues at University of Utah found no global left-brained or right-brained types. Nielsen scanned participants' brains while they lay still and again while reading. The scans did confirm areas of the brain are predominantly responsible for different functions. For example, the left side of the brain houses most of the brain's language areas and the right side

of the brain largely controls attention. But, they found no evidence the networks in the left or right sides of the brain were stronger than others with no significant variations among the participants.

> "The research on hemispheric domination doesn't support the theory of left-brain versus right-brain personality or learning style."

How did the neuromyth of left-brain versus right-brain dominance start?

How the myth of hemispheric domination became so universal is perplexing. This dichotomous thinking implies scientists aren't creative and writers aren't analytical. But what about science writers? Or accountants who play a musical instrument, fashion designers who operate global businesses, surgeons who sing and dance, and statisticians who paint and sculpt? These and infinitely more people are both creative and analytical. So where did the myth originate? A series of studies Roger Sperry conducted in the 1950s and 1960s of "split-brain" patients might be the origin of this theory.

Sperry performed tests on human volunteers whose corpus callosum — the part of the brain connecting the left and right hemispheres — had been surgically severed to treat epilepsy. In the first experiment, he instructed patients to cover one eye at a time as he showed them an image. Patients could only describe the image when shown to the right eye, which the left side of the brain controls. In the second experiment, he showed patients the same images and asked them to draw what they saw. The drawings were better when crafted with the left hand, which the right side of the brain controls. These studies provided the first evidence of hemispheric lateralization, or that different sides of the brain can perform certain tasks better than the opposite side of the brain. The mainstream media picked up on this evidence and eventually adulterated the results into left-brain versus right-brain personality typing. This happened through the process of the telephone game where you start with one sentence and end up with a far-fetched story after spreading it through dozens of people.

How common is the belief in left-brain versus right-brain dominance?

To my knowledge, no studies have examined this belief among the general public, but they have assessed the pervasiveness of the belief among educators. Sanne Dekker and colleagues at LEARN! Institute conducted a study on teachers' beliefs about the brain and found 91% of them believed imbalances between the right and left side of the brain explain individual learning differences, and 88% believed we should improve integration between the left and right sides of the brain with exercises. This may help explain why the idea of left-brain and right-brain dominance infiltrated the education system, influences curriculum planning and development, and even serves as the basis for several commercial interventions.

Why should we bust the neuromyth of left-brain versus right-brain dominance?

Despite the fact science simply doesn't support the theory that hemispheric domination exists or explain differences in personality or learning, busting this neuromyth is important for several other reasons. First, believing you are left-brained or right-brained can impede your personal or educational growth. For example, you may not try something new because you believe you may not be successful at it. Believing you are only competent at certain skills becomes self-limiting.

> "Believing you are left-brained or right-brained can impede your personal or educational growth."

Second, this neuromyth perpetuates stereotypes. For example, it encourages us to think of scientists only as analytical thinkers who aren't creative or to think of artists only as creative thinkers who aren't skilled at math or science. Finally, perpetuating this neuromyth wastes valuable time and resources developing tests to determine your "type," interventions to integrate the two sides of your brain which already work together, or instructional practices targeting your dominant side, which doesn't exist. These resources could be better used to support and encourage the use of the analytical and creative skills present in every brain.

> "[P]erpetuating this neuromyth wastes valuable time and resources [... that] could be better used to support and encourage the use of the analytical and creative skills present in every brain."

Dr. Amy Moore *is a cognitive psychologist and brain training researcher in Colorado Springs, Colorado, at the headquarters of LearningRx, the largest network of cognitive training centers in the world. She specializes in rehabilitation of cognition and learning in neurodevelopmental disorders, brain injury, learning disabilities, and age-related cognitive decline. She is also a TEDx speaker, editor-in-chief of Modern Brain Journal, a board-certified Christian counselor, and co-host of the podcast Brainy Moms. Learn more about her work at* ***www.AmyMoorePhD.com*** *and* ***www.LearningRx.com***

BY JAMES HEUER

How a **Traumatic Brain Injury Damages** the Fragility of the **Central Nervous System**

Beginning with the basics, the central nervous system (CNS) encompasses both the human brain and spinal cord. The brain is considered the most complex organ in the human body. Of all the oxygen we consume as humans, the brain utilizes 20% (one-fifth) of our total oxygen usage.

The brain consists of approximately 100 billion neurons, each connecting to thousands more. Known as the "information messengers," neurons use chemical signals and electrical impulses to transmit information from the brain and the rest of the CNS.

> "[The Central Nervous System] controls our thoughts, movements, and emotions. In addition, the CNS controls our breathing, heart rate, release of hormones, and is our critical body temperature regulator."

The CNS is a "heavy lifter" of responsibilities for the human body. This powerful body system controls our thoughts, movements, and emotions. In addition, the CNS controls our breathing, heart rate, release of hormones, and is our critical body temperature regulator.

Traumatic brain injuries can be detrimental to the CNS. Neurons are very fragile and a neuron injury can cause the signals from the brain to stop transmitting. This causes lack of muscle control or loss of feeling to the injured area. These nerve injuries can affect the brain, spinal cord, and/or peripheral nerves.

As an attorney, I stress the importance of an individual recovery program/treatment regime because no brain injury or treatment plan covers all TBIs. This is why working with clinicians to develop the most comprehensive program designed exclusively for the injured client is so important.

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

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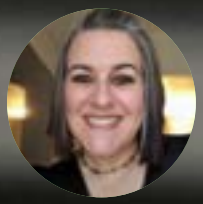

BY ELLEN FORTINI COURTAD

PHOTOS BY JENNICA E. MAES

There's something surprising about Kathy Colace Laurinaitis that she doesn't mind sharing. The managing partner of JBN & Associates recruiting firm, she is a self-proclaimed chicken.

"People know me in business, so they think I have that no-fear personality," she confides. "But I am such a chicken. I fear bugs. I will never go skydiving. I am not adventurous at all. I want to sit in front of the ocean all day long, yet I have no desire to go in it. But I think that's why with my business there is no fear, because we learn from failure."

Kathy's innate ability to get back up in the face of adversity served her well in her personal life over the past two years. She underwent surgery in June 2020 to remove a blueberry-sized mass from her brain stem. Initially diagnosed with Bell's palsy, the grandmother of five managed her symptoms, including dizziness and facial drooping, with acupuncture while she waited for her MRI appointment.

She takes some responsibility for the late diagnosis, which came along almost five months after her symptoms began. She could have called to ask if anyone cancelled an appointment for an MRI to get her own earlier, but she felt rather well and saw improvements with the acupuncture, so she waited for the formality of the scheduled appointment.

Her condition started on Super Bowl Sunday in 2020. Kathy and her husband, John Laurinaitis, planned to attend a Super Bowl party, but she woke up feeling dizzy. She describes herself as "blessed to be really healthy," noting she rarely even gets the flu or headaches. When her dizziness got worse that day, she grew concerned and laid down, assuming she was experiencing vertigo, and excused herself from the festivities.

Another party was imminent for Kathy: her daughter Nicole's baby gender reveal. The Monday after the Super Bowl, Nicole urged Kathy to go to the doctor and be checked for the flu, not only out of concern for Kathy, but also for her other guests. Unable to get to her regular doctor immediately, Kathy made an appointment for the following day at urgent care and asked her stepdaughter, Maya, to drive her. In the meantime, Kathy FaceTimed™ her daughter Brianna, Nicole's twin, also expecting a baby, to ask her if she thought the left side of her face looked droopy. Brianna did, noticeably on the left side of Kathy's mouth.

Nicole and Brianna are well known to audiences as Nikki Bella and Brie Bella — The Bella Twins, WWE (World Wrestling Entertainment) divas and stars of the E! reality shows *Total Divas* and *Total Bellas*. Kathy herself became a recurring cast member of *Total Bellas* since it began airing in 2016, with many aspects of the family members' lives on public display, including Kathy and John's 2016 wedding. Beyond running a top recruiting firm, Kathy has been in the spotlight for the better part of the past decade.

When Kathy and Maya arrived at the urgent care clinic for her scheduled appointment, the doctor told them she couldn't treat Kathy there. Unable to rule out a possible stroke, the doctor said the treatment Kathy needed was not available at the urgent care. With the Mayo Clinic just around the corner, Maya drove Kathy there immediately. At that point, Kathy's walk wasn't off balance, nor was her speech slurred, but she let the doctors know she previously experienced cold sores and shingles, caused by the virus linked to Bell's palsy.

Although she didn't feel as bad as on Sunday and wasn't as dizzy, Kathy said the doctors at Mayo still wanted to do an MRI, but due to scheduling, would be several months out. While waiting, Kathy began acupuncture treatments and started seeing results, specifically in her facial drooping.

At the beginning of May, the Mayo Clinic contacted her

Continued …

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to ask if she wanted the MRI. Kathy declined because she felt almost completely healed. Her face was nearly back to normal, In fact, while filming *Total Bellas*, the production crew commented they could hardly tell she had Bell's palsy.

In early June, Kathy went out for a run and suddenly felt nauseous. "I felt like I wasn't even going to get home," she admits. But she got home safely, laid down, and put her legs up to get her circulation moving better. "Ten minutes later, I was fine," she said, and chalked up the nausea to exercise-related discomfort.

She began researching more on Bell's palsy and learned most recovery happens between two weeks and six months, and five percent of patients never recover. For Kathy, nearly five months after her initial symptoms, this information was discouraging. Despite feeling well, she said, "It never crossed my mind that something else was wrong."

Then on Father's Day, Kathy said she felt horrible again. "It felt like it did on Super Bowl Sunday," she remembers. Her left eye was sensitive, and she felt she was experiencing a relapse. She recalls filming a scene for T*otal Bellas* when crew members recommended she go to a clinic to be seen. The following day, she was off-balance and John insisted they go to the doctor immediately. While John got tested for COVID-19 so he could accompany Kathy to her appointment, she recalls telling him confidently, "You're being tested only to come in and take me back home again."

But by 7 p.m., a neurologist walked into the room. Kathy remembers thinking, "This isn't good."

"The doctor discovered a mass on her brain stem the size of a blueberry. 'Is it a tumor, or is it cancer?' she wondered. They explained a mass is an accumulation of blood vessels in the brain."

She describes the next few moments like hearing the muffled voice of the "Peanuts" characters' teacher: "Wah-wah-wah." Kathy couldn't make out what the doctor said beyond "We found … ."

The doctor discovered a mass on her brain stem the size of a blueberry. "Is it a tumor, or is it cancer?" she wondered. They explained a mass is an accumulation of blood vessels in the brain.

That's when she met Dr. Bernard R. Bendok, the lead surgical neurologist at Mayo Clinic, who confirmed surgery was necessary. At this point, Kathy recalls COVID was at a spike, and both Nicole and Brianna expected to give birth within the month. Dr. Bendok asked if she wanted to delay the surgery until after the birth of the babies. "John asked him what he would do," Kathy said, "And Dr. Bendok said he would do it now. But they still sent me home. Surgery was scheduled for the next Tuesday, and we knew that if anyone on his team got COVID, we'd have to postpone again."

At the time, *Total Bellas* was still in production for season six and continued to film. Kathy and John quickly made the decision not to hide the diagnosis and surgery, and, in fact, to present it in the hope of further awareness of brain health.

"*Total Bellas* did not ask me to showcase this," Kathy insists. "They were as worried as we were. John asked if I wanted to, as a way to reach out to other people. We spoke to Andrea and Michelle [the showrunners], and they showcased it beautifully and were so respectful."

A very real-life reality show moment happened on-screen the day before Kathy's surgery, when she and John sat down with Nicole and Brianna to discuss their feelings and their fears. Kathy said part of that included her post-surgery fear of "Am I even going to be here?"

"We're a blended family," Kathy explains, "so I wanted to make sure that my children don't forget about Johnny in case something fatal happens. I wanted them to make sure to all stay together. [The producers] didn't say anything. They knew we were all getting together, and we just let the cameras roll."

The following day, June 30, 2020, the expected eight-hour surgery ended up lasting fourteen hours. Dr. Bendok discovered the mass hemorrhaging caused her facial paralysis. "He told my husband, one more hemorrhage and it would have been fatal," Kathy said. "God had his hand over me because, let me tell you, Dr. Bendok specializes in what I have. There is a reason I ended up at Mayo. He and his team and everything about Mayo was amazing. You always wonder if a doctor has a good bedside manner, but really all you want is for them to be best in class, and then you can handle anything else that is given to you. But he is truly an amazing individual. Not only gifted, but as a person, he is truly a very special man."

Remarkably, the doctor released Kathy two days later, and she returned home, where John eagerly became her full-time caregiver. As the general manager of talent for the WWE, Kathy said John, whom she calls "the rock of the family," is known as a confident businessman, but as her caregiver, she was able to see a different type of confidence in him. She describes him as nurturing, encouraging, and

intuitive. "It was amazing; you'd think he was a nurse," Kathy said. "He had the bathroom set up; he got a walker; he logged my medication; I never missed a meal, and he never complained. He didn't leave my side for 30 days. He is an instrumental part of why I am at the level I am in my recovery," she said. "He was off the charts. In tough times, he figures it out."

> **"I truly believe that aftercare and those treatments have helped my face. Together they are a blend of western and eastern medicine, and it's brought a lot of circulation into that side of my face."**

One month after her initial surgery, both of Kathy's grandsons were born: Nicole's son, Matteo, with professional dancer Artem Chigvintsev; and a day later, Brianna's son, Buddy, with professional wrestler Brian Danielson. The film crew captured the moment Kathy and John met the babies in a touching scene on *Total Bellas*.

Kathy experiences double vision since the surgery and takes part in physical therapy for her eyesight. She didn't drive for six months, but now drives with an eye patch. She went through two eye surgeries because her left eye wouldn't close all the way. In September 2020, the doctor placed a titanium weight in her upper eyelid, and surgeons removed six inches of muscle in her thigh to create a sort of hammock in her lower eyelid to enable blinking. "I was blown away at how my leg was so much more painful than brain surgery," Kathy said.

In February 2021, another surgery with the titanium weight helped her eyes to blink. She continues with acupuncture, as well as pulsed electromagnetic field therapy (PEMF). "I truly believe that aftercare and those treatments have helped my face. Together they are a blend of western and eastern medicine, and it's brought a lot of circulation into that side of my face." Kathy said she was told to expect a 30-40 percent chance of full recovery from the facial paralysis in the first year, but she thinks improvement will take longer. "I continue to get movement, even a little movement, but it's still movement, and I have hope for full recovery," she said.

Kathy isn't stopping her work with JBN & Associates for a pandemic or slowing down for her illness. Rather, she took on an additional role — that of advocate. Kathy plans to use her platform to encourage the importance of early diagnosis, as well as awareness of brain injuries. "My message is a couple of things," she said. "First, don't be me. Get the MRI. Just because it seems to be Bell's palsy, take the step to get the MRI. I stopped calling because I was getting results from acupuncture. But both relapses were hemorrhages."

Secondly, Kathy continues to promote awareness of brain issues, as she did on *Total Bellas* from the onset. "I got so many DMs from people dealing with Bell's palsy saying, 'Thank you for showing yourself even when it's so uncomfortable. A friend's niece got diagnosed with Bell's palsy after I did and recovered quickly and I thought, oh, it must be youth. But then she got an MRI after my situation, and she had a tumor around her temple area.' So, getting the message out does help, even if it helps just one person."

Kathy is also quick to give credit to her caregivers, namely John. "Recovery is the team that surrounds you," she said. "Not just the medical team, but family, too. Caregivers go unrecognized. I didn't have to worry about so much because John took care of everything, and when you don't have to worry about that, it just allows more time for recovery. Not everyone has that, and that's why this organization, [the Brain Injury Alliance of Arizona], is so important. We want an avenue for those who don't have that to have somewhere to go."

> **"'Recovery is the team that surrounds you,' she said. 'Not just the medical team, but family, too. Caregivers go unrecognized. I didn't have to worry about so much because John took care of everything, and when you don't have to worry about that, it just allows more time for recovery.'"**

Carrie Collins-Fadell, CEO of the Brain Injury Alliance of Arizona said Kathy's willingness to share her story so publicly is rare and will go far in promoting awareness. "Kathy really opened the door for others to talk about and think about their own brain health," Carrie said. "She was going through a difficult health challenge in the middle of a pandemic with uncertain outcomes, and she chose to pay it forward, using her platform to educate and help others. It's incredible and simply not something we often see in the brain health and brain injury realm, particularly in successful, high-performing CEOs like Kathy. There is always such a mystery around brain health and Kathy chose to swing the door wide open."

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Kathy said her own best habit is her ability to love unconditionally. Love led to her revelation of how to share her passion within the brain injury community. In September 2020, Kathy went to the Mayo Clinic for nerve testing, where nurses used pins to test the nerves of her face. She said she could tell by their expressions things weren't going well. "I laid there thinking, I might not get total recovery or any recovery from where I am at right now. But what I do know is that it's gonna be tough, and I have to learn to love myself for who I am now. There has to be a way to help others learn to love themselves for who they are now, and their family, their surrounding team, or whatever that looks like for them."

> **"I might not get total recovery or any recovery from where I am at right now. But what I do know is that it's gonna be tough, and I have to learn to love myself for who I am now."**

Through her own brain health challenge, Kathy came to know the work and mission of nonprofits in the brain health community and found her place within the support community. "I probably never would have known about these organizations unless this happened to me," she said. "The brain affects so much, and not everyone is as blessed as I am to search out and find different ways to help myself when days are tough. It can be addiction, depression, accident trauma, or disease and there are resources for people who might think they have hit a wall and can't progress. They teach them so much."

Her drive for awareness begins right at home with herself. Kathy admits she is "just at the beginning" of understanding more about the brain, and learned a few things she readily shares. "I think of the brain as the leader of the pack. That fascinates me … what it controls, what it does. Just think about learning a language or to walk. I look at the brain as the crown."

That's a crown Kathy feels doesn't get enough attention. "You never see anything in lights about brain injury and recovery," she said. "It flies under the radar, and there are so many great people involved and so many people deal with brain injury."

Kathy said she recently reconnected with someone she hadn't spoken with in many years, only to find out her former acquaintance had also experienced a brain injury. The injury occurred many years before they met and left her with significant memory loss. "I never knew," Kathy said. "It was never a topic of conversation. But the brain … it's our hub. The hub of the body."

She comes by her positive outlook honestly. The youngest of five children born to Alice and Joe Colace, Kathy said her family raised her in an encouraging environment. "My father told us, 'You wake up every morning, and you choose how to face your day.' It's the one thing we can control, and it was the foundation of how we were raised — loving and positive," Kathy said. She describes her parents as having strong faith and being a strong team. "My husband and I have only been married five years, but that's how Mom and Dad were, just a strong team. They started inspiring us kids and making us believe we could do anything without us even knowing it."

This inspiration brought Kathy and her family through good and difficult days. She counts among her biggest challenges being a single mother at age 35 while running a household and building a company. "We were just keeping the wheels on the bus," she said. She considers her greatest successes as "Being a parent and a stepparent, as well as my profession, but that is so minute compared to just living life and surviving the last year."

Ellen Fortini *is a globe-trotting writer and editor who currently lives in fabulous Las Vegas, Nevada.*

UNITED STATES
Brain Injury Alliance

Women's Brain Health

Legislative & Research Update for the Congressional Brain Injury Task Force

HOSTED BY – THE USBIA PUBLIC POLICY COMMITTEE

Friday, March 11, 2022

8:00am PST / 11:00am EST

With Special Guest

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Miss America 2022
& Biomedical
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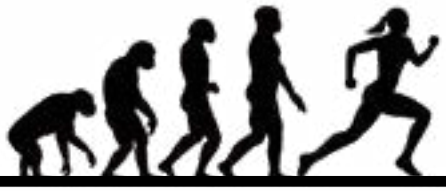
DANCING WITH DARWIN



BY KELLY HARRIGAN

Today, we're taking dance lessons with Darwin, and our dance instructor is Dr. Steven Saltzman. Saltzman is a Johns Hopkins-trained physician with a background in anti-aging and regenerative medicine and a passion for wellness and integrative medicine. His unique approach to patients combines his background in both modern and alternative medicine with his philosophy of seeking natural therapies and proven science. He tries all these therapies on himself before recommending them to patients.

You can use both approaches to heal with an emphasis on utilizing what is safe, natural, and effective for you.

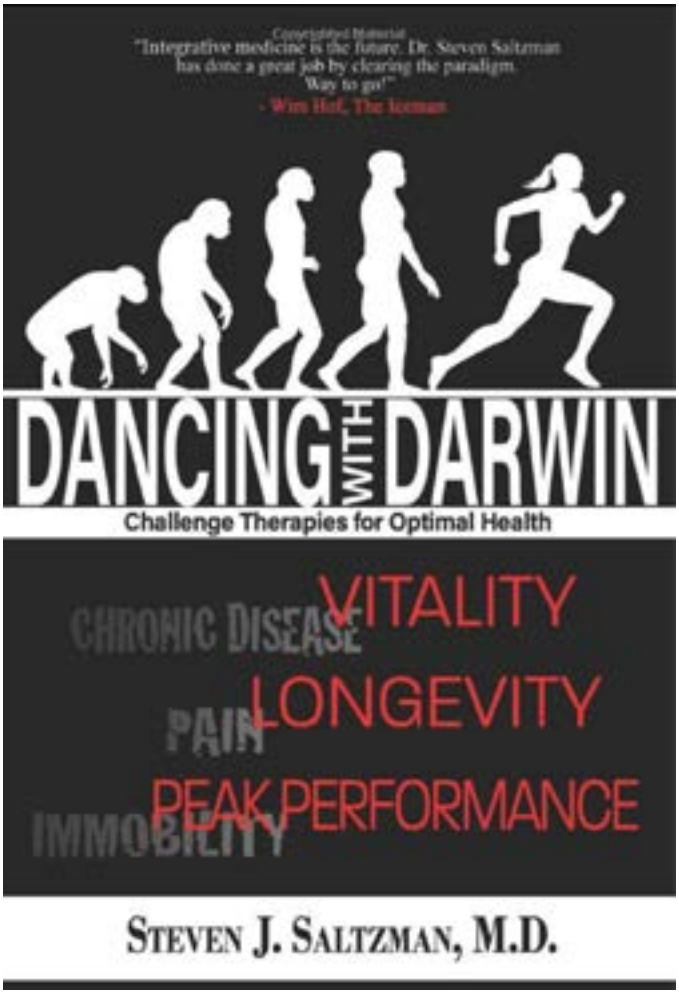
Saltzman spent the last 15 years researching methods that make the greatest contributions to our health, while being non-invasive and avoiding prescription drugs. Saltzman developed a three-pronged modality: foundational care, oxygen therapies, and challenge therapies.

No, this isn't a Lego game, hitting up the oxygen bar, or being on a game show. Saltzman's book, *Dancing with Darwin: Challenge Therapies for Optimal Health* (Coldwater Press, 2020) explores the three-pronged modality, so let's dive in.

"Foundational care" means the basics of good health. Eating a healthy, organic diet. Making sure you hydrate. Detoxing your body from processed food and unhealthy chemicals. Exercising appropriately for where you are with your health. Maintaining healthy sleep habits (say goodbye to screen time well before bedtime, indulge in a good book, and treat yourself to a face mask and tea). Trying not to overschedule yourself and reducing lifestyle stressors.

Tell me something I haven't heard before ...

Saltzman's next phase is oxygen therapies. This isn't just a post hangover indulgence at the Las Vegas airport after a bachelor party. Oxygen is the currency of life in our bodies. The more you have, the better off you are. Oxygen increases cellular work, so 'Show Me the O2!' Modern day humans don't get enough oxygen because we live in an environmental era of increasing carbon dioxide and daily exposure to other increasing toxins, forcing our bodies to work overtime. Deep breathing calms our central nervous systems. Enabling more oxygen to work its magic in our cells fights environmental stressors, helps our bodies run at an optimal level, and assists in the anti-aging process and fighting disease. His book details the "disease costs" we pay for having low levels of cellular oxygen.



Here's where we rise to the challenge!
(Everybody loves a bad pun ...)

Dr. Saltzman based his challenge therapy on a widely known but underutilized science of hormesis. The essence of this science is distilled to the phrase "what doesn't kill you makes you stronger" (Kelly Clarkson for karaoke night, anyone?). This means a stressor that engages us makes us more adaptable and tolerant of it in the future. The human species spent 2.5 million years adapting so the fittest survived. In our modern era in first world countries, we don't do that anymore because we live in a state of continuous comfort: the opposite of evolutionary history. We live in perfectly temperature-controlled climates, enjoy a plentiful food supply, and face no significant threats except those humans created.

These challenge therapies, such as exposure to temperature extremes, fasting, and exercise, as well as the use of medical oxygen therapies, demonstrate hormetic "challenge" therapies. Dr. Saltzman's approach can meet you where you are and can cover a wide range of needs from reversing medical disease and states to supporting longevity and even promoting peak performance for athletes. The ramifications are significant, both physically and financially. Better health means reduced medical costs. If you have a TBI, your credit card will agree.

Increased education about this concept can assist people with introducing challenge therapies into their routines to restore health and vitality to their lives. This concept takes therapies an individual may need and creates a bespoke, or tailor-made, program for that person and their health at their current state, with the idea of laying a foundation to optimize their health to get them to the next level. For example, someone with a TBI may need physical therapy to retrain muscles. You're not going to run, or walk, or lift 100 pounds until you properly retrain your muscles in micro movements to get you to the point where you can begin training for those bigger leaps.

Each person is unique and deserves medical care tailored specifically to them.

In any type of brain injury — whether it's a stroke or concussion — cells die, and that area does not recover. However, the outlook is positive for the protective penumbra around those dead cells. This penumbra contains cells in a state of suspended animation with a low oxygen supply from the injury and inadequate blood flow to the penumbra. Treatments like the hyperbaric oxygen chamber show cellular angiogenesis, or new blood vessel growth and increased blood flow around the damaged area, helping the body regain function.

The current medical system in this country focuses on profit, not health, as evidenced by the opioid epidemic. *Dancing with Darwin* explores Saltzman's modalities and suggestions for integrative and natural therapies, with a goal to assist people without significant financial resources in finding better options than surgery or pharmaceuticals. Sing along with Kelly on the radio as you explore Dr. Saltzman's suggestions.

Dr. Saltzman is the founder and director of VitalityHealthChallenge ***www.vitalityhealth.challenge.com*** and the author of *Dancing with Darwin*.

Kelly Harrigan *is a veteran, a writer, a TBI survivor, and a single mum of a girl child and a Frenchie, often found with oolong tea in one hand and humor in the other. She lives near Annapolis, Maryland.*

Looking Through **Different Glasses** Can Benefit Muddled CNS

BY DEBORAH ZELINSKY, O.D.

"Our entire biological system, the brain and the earth itself, work on the same frequencies," said Nikola Tesla, the late 1800s/early 1900s inventor and electrical and mechanical engineer. But traumatic brain injury (TBI) — even a mild concussion — may knock the central nervous system (CNS) off that frequency, resulting in abnormal perceptions and aberrant responses to the surrounding world.

That prompts the central question: How does one get the CNS back online after a TBI? Will head-injured patients ever be able to view the world once again through rose-colored glasses? Well, they may not always come with rose-colored filters, but highly individualized "brain" glasses may be exactly what a patient needs to return their CNS to "earth frequency."

What is it about glasses, though?

To understand the answer, one must first realize how the retina serves as a critical component of the central nervous system, which includes the brain and spinal cord. The retina acts as a primary portal for information to the brain. Environmental signals in the form of light pass through the retina and convert into electrical signals that propagate through neurons and interact with critical brain structures.

Head injuries can distort retinal processing, namely the brain's ability (partially beneath a conscious level of awareness) to filter signals passing through the retina and then forward the filtered version for further brain processing. Through this "further processing," the brain combines retinal signals with other sensory signals (from hearing, smell, taste, and touch externally, as well as from vestibular and proprioceptor input and many types of interoceptors), synthesizes the information, and then enables a person to react and respond in ways dependent on the individual's many internal sensory signals.

Retinal signals interact not just with the visual cortex (for eyesight), but affect other, significant regions of the brain as well, like the hypothalamus, the cerebellum, and the brainstem. This implies stimulation of the retina can impact regulation of basic physical, physiological, and even psychological processes, including motor control, posture, emotions, and perception. Based on individual experiences and sensory integration, perception serves a key factor in decision-making. After a TBI disrupts sensory integration, the trickle-down effect skews perception, ultimately affecting decision making.

As a piece of brain tissue, the retina is much more than a sensory system for seeing. It provides information to integrate an individual's senses, including eye-ear coordination based on a perceptual mapping of the environment. Brain injury and neurological disorders like Alzheimer's disease disrupt this sensory synchronization and sensory mapping of space. When central and peripheral

eyesight fail to interact appropriately and eyes and ears fall out of synchronization, patients often become confused about their environment, have a narrowed perception and awareness, exhibit inappropriate reactions and responses, and experience difficulties with cognitive skills including learning and memory.

Researchers writing in a 2017 edition of *The American Journal of Pathology* determined that 80 percent of combat veterans exposed to blasts developed long-term changes to their retinas, even without any discernible brain injuries. In this particular project, scientists considered how these retinal alterations led to "visual impairments" among studied veterans. But, because the retina does far more than signaling the brain's visual cortex, one might assume a percentage of these same veterans also developed other symptoms related to impaired retinal processing — such as light and sound sensitivities, headaches, problems with memory and concentration, loss of emotional control, even behavioral abnormalities.

A more recent study, this one appearing in a November 2021 issue of *Communications Biology*, suggests the ways in which different regions of the CNS, most specifically those in the brain, interact with each other affects a person's behavior and controls emotions. The investigators reported study participants with anxiety disorders visualized well-defined "safe spaces" as areas of fear and potential threat. Like head injury, anxiety disorders and other neurological problems can cause brain dysfunction and visual processing disorders.

"Head injuries can distort retinal processing, namely the brain's ability (partially beneath a conscious level of awareness) to filter signals passing through the retina and then forward the filtered version for further brain processing."

The CNS constantly receives, sends, and interprets informational signals emanating internally from all parts of the body and arriving externally through the retina from the environment. These signals enable the CNS to make cognitive decisions on what we should do or how we should act at any given time. Those decisions are modified or governed in part by the "How Am I?" brain pathway. If we are awake, motivated, and energized, we will act much differently than when sleepy, fatigued, hungry, and, of course, injured.

Head trauma disrupts sensory signals. Such disruption causes a cascade of symptoms that can disrupt the "How Am I?" pathway, thereby making its victims chronically uncomfortable, impacting their decision-making, and perverting their responses to the world around them. Case in point: a report published in a November 2021 issue of the journal *Science* suggests the CNS processing of feedback signals from the body regulates emotions, including fear. If this body-brain interaction becomes muddled by injury, a person can be put into chronic fight-or-flight mode, experiencing panic attacks, anxiety disorder, or even post-traumatic stress disorder (PTSD). The new book *Total War on PTSD*, by Lieutenant Courtenay Nold, describes 46 non-pharmacological ways of addressing PTSD.

PTSD keeps a patient's mind and body systems in a hypersensitized "fight-or-flight" mode. Common PTSD symptoms include changes in perception and cognition, which, in turn, cause abnormal reactions to the environment, and affect awareness and attention. A person with PTSD often suffers from spatial dysfunction and disorientation. Their visual world may constrict because peripheral sight becomes either hypersensitized or turned off. The patient might fail to pick up all surrounding environmental cues and expend more mental and physical energy to make "sense of everything," become "wiped out," and eventually find it easier to "tune out."

This struggle to understand the environment can lead to depression, irritability, outbursts of anger, irrational behavior, and sleep problems, including nightmares. Biochemical changes also occur in response to disruptions in awareness. Stress chemicals reach higher levels, promoting a PTSD patient's chronic state of survival.

But, back to the retina and eyeglasses — even if they are not rose-colored.

As a result of expanding knowledge about the retina and application of advanced optometric science, the Mind-Eye Institute achieved well documented, clinical successes in using eyeglasses — not just ordinary eyeglasses, but highly individualized brain glasses — to balance sensory signaling. That balance lessens the stress chemicals produced and often diminishes symptoms of TBI. By varying the amount, intensity, and angle of light passing through the retina, brain glasses help restore synchronization to TBI patients' sensory systems; alter their awareness, attention to, and understanding of what happens around them; restore normalcy to patients' visual processing skills; and bring a return of comfort and relief.

The importance of the retina has long been undervalued. Yet, the retina is often the key to returning patients to quality life. Patients sometimes refer to their brain glasses as "magic glasses." But there is nothing magical about them.

Indeed, it's simply science at work, or, as one of our patients coined it, the glasses are "mathemagical."

Deborah Zelinsky, O.D., *is a Chicago optometrist who founded the Mind-Eye Connection, now known as the Mind-Eye Institute. She is a clinician and brain researcher with a mission of building better brains by changing the concept of eye examinations into brain evaluations. For the past three decades, her research has been dedicated to interactions between the eyes and ears, bringing 21st-century research into optometry, thus bridging the gap between neuroscience and eye care.*

Paying Attention to Tics and Triggers

BY IAN HEBEISEN

Over seven years ago, my mom received a traumatic brain injury from a car accident. As a result, she sustained nerve damage that often leads to painful contortions in her arms and legs. At first, we couldn't tell what would set off her arm spasms, but as time went on, we began to discover patterns and identify triggers.

One of her most notable contortions we lovingly refer to as "porging" – she'll start to frown, putting on an expression that matches the "Porg" aliens from one of the most recent Star Wars movies. Her giant frowns typically occur after seeing a confusing image (lots of twisting shapes and lines, a dark and overly saturated picture, frightening imagery) or listening to dissonant music.

Auditory stimulation tends to be one of her biggest triggers. A sudden loud noise can send my mom into painful contractions, twisting her arms and flaring up the nerves in her legs. After a while, her muscles will calm down, but she can still be on edge for the rest of the day.

By looking at her triggers and the effect they have on my mom's body, we can see the true interconnected nature of the nervous system. Admittedly, the relationship between triggers and the results can seem confusing at first – why would visual or auditory stimulation impact her control over her arms and legs?

My mom sat through many appointments with functional neurologists, including Dr. Paul Deglmann, DC, DACNB, FACFN. "He described a sort of metabolic threshold within my brain," said my mom. "Whenever my brain crossed that threshold, it would trigger these symptoms."

In a nutshell, after her accident, my mom's brain developed a limit to the number of stimuli it could handle at once. Her nervous system pertaining to the five senses can only take in so much information. Once that part of the brain maxes out, it passes off the additional stress to other parts of the brain, usually ones that control the automatic processes in our body. This includes the medulla, which monitors functions such as breathing, heartbeat, blood flow, and so on.

The medulla already controls so much it overloads when it takes on additional stress. With both systems overloading – the sensory parts and the subconscious parts – the nerves take on the additional stress, causing painful spasming.

Her spasms demonstrate how closely related the systems of the brain are, and as a result, we've had to pay close attention to things we otherwise would not even consider. "It's all about learning to stay within the threshold limit and managing my stressors and inputs," said my mom.

We mainly look out for particular sounds and songs that trigger my mom. For example, when playing music aloud, we skip over songs with a heavy emphasis on offbeats (think back to the era of "ska" music). We also screen movies for her to make sure no scenes are overly stimulating. You remember that spooky tunnel scene in Willy Wonka and the Chocolate Factory? She would definitely need to close her eyes or risk an onset of a series of spasms.

Through her various appointments, my mom built an arsenal of brain exercises to help her manage that threshold. In addition, different sets of eyeglasses aid in the amount of input she receives. She's worn glasses with tinted lenses to reduce the amount of light intake, and now wears Brainwear® Glasses from the Mind-Eye Clinic.

Managing her symptoms remains an ongoing process, involving a lot of close monitoring of what triggers her spasms. Patience plays a big role in this, but so does attentiveness – if you notice some new tic or trigger developing, take note of it. Not only will it help you prevent a possible flare-up in the future, but might help a functional neurologist uncover the cause of an unknown symptom.

Ian Hebeisen *graduated from Saint Mary's University in May 2020, earning a degree in Literature with a Writing Emphasis. Now living in the Twin Cities, Ian writes comics, graphic novels, and poetry. In his spare time, he enjoys playing board games with his family.*

YOGA: *Bird Dog Pose*

BY AMY ZELLMER, EDITOR-IN-CHIEF

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, be able to balance, or even be able to stand up. The beauty of yoga is that every pose can be modified to accommodate anyone.

An important aspect of yoga is your breath. Connecting your breath to your body and getting oxygen flowing to your brain makes yoga powerful for recovery. Yoga also quiets the mind and lets anxiety and distracting thoughts drift away.

> "Connecting your breath to your body and getting oxygen flowing to your brain makes yoga powerful for recovery."

Bird dog pose (Parsva Balasana) helps strengthen and stabilize the core, strengthen the low back, enhance your ability to balance, and boost brain function through the use of contralateral relationships between the arms and legs.

As a core stabilizer, bird dog is easier on your back than crunches or sit-ups. The pose also engages the hyoid bone — a small bone at the top of your throat used for swallowing — and also helps determine your posture.

Instructions:

1. *Begin on your hands and knees. You may wish to place a yoga blanket under your knees for extra padding.*
2. *As you inhale, extend your right arm forward, straightening your elbow (be careful not to hyperextend). At the same time, extend your left leg straight back without lifting your leg above your pelvis (which can cause stress on your lower back).*
3. *Stay for a few breaths.*
4. *As you exhale, bring your hand and knee back to the mat.*
5. *Repeat on the other side.*

Modifications:

- *If you notice your pelvis tipping or your weight shifting as you lift your leg, keep your foot on the floor with the knee extended instead of bringing it up.*
- *You may wish to come to child's pose in between sides.*
- *If you would like to practice bird dog pose in a chair, simply bring the right arm overhead, and the left leg out in front and follow the rest of the steps above.*

Join me for monthly yoga classes via zoom for only $10 a month: ***www.patreon.com/amyzellmer***

VALOR®
Essential Oil

BY 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 have a variety of uses.

All oils are not created equal. Young Living is the only brand I personally trust because I know they have complete control over their product from seed to seal. Oils sold at health food stores can be misleading. They are not regulated by the FDA, so you must look closely at the labels. The labels may say they are 100% therapeutic-grade oils when they are not. If the ingredients list anything other than the plants, or if the label has statements like "For external use only," "For aromatic use only," and/or "Dilute properly," the oil inside that bottle may have been cut with other oils, synthetics, or chemicals.

Valor®

One of the original blends formulated by Young Living founder D. Gary Young, Valor remains a longstanding member favorite. The blend features carefully selected essential oils, each with unique aromatic and topical benefits: frankincense for its uplifting, earthy aroma and skin-smoothing properties; black spruce for its grounded, woodsy aroma; blue tansy for its inspiring aromatic profile; geranium for its sweet, floral aroma; and camphor wood for its skin-benefiting properties and strong, herbaceous scent.

Young formulated Valor® essential oil based on historical writings about Roman soldiers. who supposedly applied plant extracts and botanicals to instill feelings of courage and confidence before going into battle.

FEATURES & BENEFITS

- *May enhance the appearance of healthy-looking skin*
- *Enhances massage for a rejuvenating experience*
- *Features a positive aroma to inspire confidence and courage in a foundational daily blend*
- *Provides a key component of the Raindrop Technique (a combination of reflexology, aromatherapy, massage techniques, and essential oils)*
- *Creates a grounded environment for yoga and meditation*

SUGGESTED USES

- *Apply Valor to the bottoms of your feet and/or the back of your neck to unwind before bed.*
- *Apply Valor to the back of your neck for an aroma that inspires feelings of confidence.*
- *Refresh throughout the day by inhaling the scent of Valor directly, or massage it onto your neck, chest, or hands and wrists.*
- *Apply Valor to your wrists and hold them together to feel the consistency of your chi.*

*These statements have not been evaluated by the Food and Drug Administration. Young Living products are not intended to diagnose, treat, cure, or prevent any disease.

The Power of Garnet
for Energy and Wellness

HEALTHY LIVING

BY KRISTEN BROWN

When we get overwhelmed or stressed, our bodies and energy get blocked. This can cause you to feel foggy, sluggish, scattered, and generally unwell. Several powerful crystals can help you refocus your energy and amp up your physical body, but one of the best is garnet. It's a multi-functional stone used since ancient times for wellness and energy.

Three ways garnet can energize you and bring flow to your body, mind, and spirit:

1. **Activate Your Energy:** *Garnet is a powerful crystal infused with fire energy to amp up your motivation and flood you with take-action vibes. Use it when you need a little kick in the pants or to get unstuck.*
2. **Create Connection:** *Garnet brings balance to volatile emotions. This makes it a very useful stone to maintain a level head and engage with others with more empathy and open-mindedness. Garnet also calms you when you feel anxious or overstimulated, giving you a peaceful demeanor in your relationships. Wear it as jewelry or keep one in your pocket or purse for ongoing emotional support and connection to others.*
3. **Strengthen Nervous System and Body Functions:** *A master at purifying and regulating body systems and functions, garnet brings healing energy to your body when you're ill or feeling physically off. Meditate with garnet stones surrounding you or take a bath with garnet in the water to surround yourself in its healing powers.*

A powerful stone to use in your daily life, garnet brings fresh energy and consistent flow to your thoughts, body systems, and spiritual connection. Use garnet during meditation, yoga, and baths and carry the stone with you and wear it as jewelry. Garnet also makes a meaningful gift for loved ones or co-workers. Get yourself a garnet crystal and let it unblock your best self.

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.* ***KristenBrownPresents.com***

SLOW COOKER CHICKEN FAJITAS

HEALTHY LIVING

BY AMY ZELLMER, EDITOR-IN-CHIEF

Serves: 8 **Prep:** 10 mins **Cook:** 3-4 hrs

What you need:

- *2 lbs. (900g) chicken breasts*
- *4 bell peppers, sliced*
- *1 red onion, sliced*
- *2 tbsp. honey*
- *1 tbsp. olive oil*
- *1 lime, juice*
- *1 tbsp. chili powder*
- *1 tbsp. cumin*
- *1 tbsp. paprika*
- *1 tsp. salt*
- *1 tsp. onion powder*
- *1 tsp. garlic powder*
- *1 cup chopped tomatoes*

Directions:

1. *Place half of the sliced peppers and onion in the slow cooker. Layer the chicken and coat with honey, olive oil, lime juice, all the seasonings and chopped tomatoes.*
2. *Lastly, add the remaining peppers and onions and cook for 4 hours on high.*
3. *Remove the chicken and shred it with a fork, then return it in the slow-cooker. Mix well and cook for another 10 mins. on low.*
4. *Assemble fajitas and enjoy.*

Suggested serving

(not included in nutrition info):

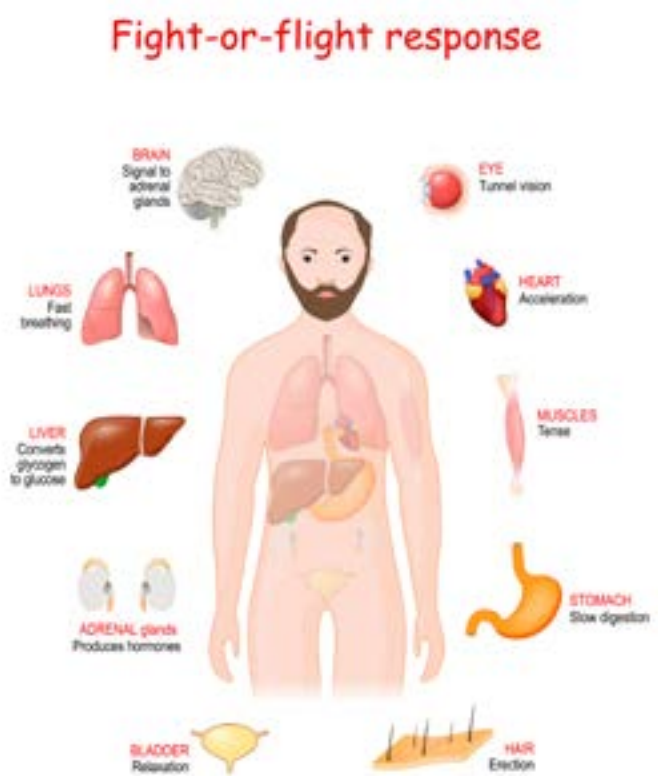
- *tortillas, cream, guacamole, coriander*

Nutrition per serving:	183 kcal	3g Fats
	12g Carbs	26g Protein

How Fast is Your FIGHT *or* FLIGHT *Going?*

BY DR. SHANE STEADMAN, DC, DACNB, DCBCN, CNS

One of the oldest and most primitive areas of the brain controls our fight-or-flight response. Located in the midbrain, our fight-or-flight system automatically responds to acute stress, trauma, or perceived danger. This is a very necessary part of the brain when needed, but usually in small increments of time. We see examples of this when watching an intense or scary movie. We watch a character go into a dark alley downtown in the middle of the night. Suddenly, the person becomes aware of their surroundings, seeing shadows as the water droplets hit the pavement. Then a cat jumps out of nowhere, and they hear the proverbial pin drop. This type of suspense makes our fight or flight increase until we eventually jump out of our seats. This should be a temporary response where we feel our heart race, our breathing change, and our hands get clammy. We should be able to recover back to baseline quickly with no adverse effects.



Now imagine living in a state of fight-or-flight every day. This area of the brain easily turns on (triggers), yet, for some, their off button is broken. In another analogy, miles per hour (mph) describes the effect. Pretend a person's fight or flight should be around 45 mph, a nice cruising speed, easy to manage. When someone becomes stressed, their speedometer should go up to 75 mph and then back down. A person who experiences trauma and other types of PTSD might sit at 150 mph or even more. Their fight-or-flight system is primed and does not take much to stimulate it further. This is not sustainable for a long period of time without consequences. Like driving at high speed, the midbrain can seem out of control and difficult to manage. When people sustain a brain injury, trauma, or certain types of stress, the fight-or-flight area of the brain can stay elevated for days, weeks, or even years. This is like having the brakes go out with nothing to stop the fight-or-flight system.

People who struggle with an overactive fight-or-flight system often have the following complaints:

- *Light sensitivity*
- *Sound sensitivity*
- *Increased sensitivity to touch*
- *Heightened smell*
- *Changes in pupils*
- *Increased heart rate*
- *Shallow breathing*
- *Cold and clammy hands*
- *Racing thought*
- *Inability to stay asleep*
- *No tolerance for people in their personal bubble*
- *Tinnitus*

One of the struggles with an increased fight-or-flight mechanism is the amygdala (limbic system) can also become elevated. The amygdala is responsible for fear and anxiety. Now imagine being fearful and anxious almost every day. Those struggling with an increase in fight-or-flight and the amygdala can become anxious about "trivial" things. What might be a small matter to others may be enormous to the person struggling with anxiety. Struggling with this can result in significant insomnia, OCD tendencies, phobias, and other anxiety disorders.

The big question becomes what can be done to help manage an increased midbrain, or what can be done when it speeds up and goes out of control. The first step is to identify the causes and triggers and reduce them as much as possible. Anything creating a stress response can result in a fight-or-flight response. This ranges from a food allergy to a stressful relationship. Counseling can be an important step in working on relationships, past traumas, and other causes of PTSD.

The next area to work on is the metabolic system. The metabolic system involves balancing hormones, stabilizing blood sugar, normalizing adrenal function, thyroid function, and even normal iron levels. A deficiency or an endocrine imbalance can impact brain function, creating internal stress or inflammation, which may cause an increase in fight-or-flight.

Finally, working with someone who understands functional neurology can be beneficial. An exam that looks at the different areas of the brain is important for developing a treatment plan to bring homeostasis. After a comprehensive workup, a treatment plan consists of dietary changes, supplemental support, metabolic support, neurotransmitter support, and brain-based therapies. Unfortunately, no one protocol fits all. Find a practitioner who understands the complexity of the fight-or-flight system to guide and advocate through the journey of healing.

Techniques that can be started now involve relaxation, breathing exercises, and medication programs. Many programs can be downloaded as an app. Equipment like blue-blocking glasses or rose-colored glasses, used when needed, can help calm the fight-or-flight response. People mostly wear these glasses with computer use, TV, or bright lights. Supplements that support GABA, adrenals, and inflammation can be a start to modulate the stress response and midbrain function.

The process may feel like trial and error, but each person differs with their own history and imbalances. The above is a good start, but finding a practitioner well-versed in this topic will be vital to the support system.

Dr. Shane Steadman, DC, DACNB, DCBCN, CNS, *is the owner and clinic director of Integrated Brain Centers. To learn more about how they can help with concussions, stroke, and TBIs, please visit* ***www.integratedbraincenters.com.*** *For a free consultation, please call 303-781-5617.*

From CALAMITOUS to CANNABIS:

Using Medical Marijuana to Turn Things Around

PODCAST HIGHLIGHT

BY IAN HEBEISEN

Over her life, Nikki Lawley has sold H-Vac filtration systems, dealt cards at a casino, and started her own company, solidifying her as a true renaissance woman of the modern age. Most recently, she worked as a pediatric nurse in Buffalo — a career choice resulting in a TBI.

During one shift, a child became combative while receiving a vaccine, and Lawley went to restrain the child for the safety of everyone in the room. Still fighting, the child head-butted Lawley, slamming her head into a wall. "I had instant numbness and tingling, and pretty much totally blacked out for a second," said Lawley. She received her third TBI that day, and this one proved to be calamitous.

This final TBI caused cognitive deficiencies, anxiety, depression, memory loss, and pain. Lawley began visiting doctors and specialists, undergoing various tests to find a solution to her symptoms. However, the quality of care was not what she needed. "Worker's compensation doesn't really pay for anything that's holistic, or alternative therapies such as functional neurology, chiropractic, things like that," said Lawley. "Certain chiropractors will be covered, but it's super limited in the scope of services."

She struggled to get out of bed, construct thoughts, or even do basic math — a staggering notion considering her past as a casino dealer. "It was so hard on my whole family and friend system," said Lawley. "No one knew who I was anymore."

Her husband suggested taking a vacation to get away from things, and they flew to Las Vegas. In their hotel room, Lawley fell into a depression. "I was contemplating my death, looking over the hotel balcony," said Lawley. However, before she could do anything drastic, Lawley saw a billboard advertising medical marijuana. She reevaluated the situation and realized the prescription drugs she took messed with her brain chemistry. She decided to try the medical marijuana route.

"I expected to be able to come home to New York and have access to the same products. Unfortunately, at the time, chronic pain was not one of our approved conditions," said Lawley. "So that meant I was back to square one and continued pharmaceuticals."

Some of Lawley's friends lived in Canada, where medical cannabis covers more conditions. Thus, Lawley became a sort of "Canadian cannabis refugee," and began learning about cannabis as a medicine. She discovered that despite cannabis's ability to aid TBI and concussion recovery, medicinal marijuana is not being thoroughly discussed in medical fields. Lawley even found herself ostracized from the medical community. "I went from being a respected healthcare professional, to doctors no longer having that respect."

> **"[D]espite cannabis's ability to aid TBI and concussion recovery, medicinal marijuana is not being thoroughly discussed in medical fields."**

The cannabis created a noticeable shift in Lawley's pain levels, and improved her quality of life. With her pain down, Lawley could focus on actively living her life. "It doesn't fix everything, but it allows you to focus on things besides pain." Lawley medicates every two to three hours,

keeping cannabis in her system. "That allows a constant level of awareness and a quality of life that is so different from when I'm not medicated," said Lawley.

Different strains achieve different outcomes. One variety might be better for pain relief, while another might also help with cognitive function. Doing research on the plethora of strains available will help you determine the right one for your condition. Testing the products before consumption is important as well. Each constituent in the plant serves a purpose (fighting inflammation, pain, or swelling, etc.), so testing will ensure you're taking the proper strain to meet your needs.

> **"Different strains achieve different outcomes. One variety might be better for pain relief, while another strain might also help with cognitive function."**

"I think we're doing what nature meant it to do," said Lawley. "I'm so grateful for learning the simple things that I can then put into words and help educate other people."

Lawley encourages others to educate themselves using reputable sources. Online communities exist to inform people about medicinal marijuana, including cannabiscommunity.org. For medical professionals, try holisticcaring.com. Other online resources can help you get a medical card, including leafwell.co.

You can find Nikki Lawley on LinkedIn, Facebook, Instagram, and Linktree. To hear the full conversation, check out Faces of TBI Podcast on Apple Podcasts, or wherever you find your podcasts.

Ian Hebeisen *graduated from Saint Mary's University in May 2020, earning a degree in Literature with a Writing Emphasis. Now living in the Twin Cities, Ian writes comics, graphic novels, and poetry. In his spare time, he enjoys playing board games with his family.*

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