# THE BRANN HEALTH

# BRAIN INJURY SURVIVOR & SON

Share Road to Recovery

Manage an AMYGDALA HIJACK in 3 Steps

HORMONE IMBALANCES Post TBI

THE HORMONE ISSUE Living Your Best Life After Brain Injury | Jan/Feb 2022

### THE BRA&N HEALTH

#### **JAN/FEB 2022 VOLUME 4 | ISSUE 1**

**EDITOR-IN-CHIEF** Amy Zellmer

**GRAPHIC DESIGNER** Heide Woodworth

#### **COPY EDITORS**

Lynn Garthwaite **Claudette Hegel** 

#### CONTRIBUTORS

**Kristen Brown** Jonathan Chung, DC Dr. Tatiana Habanova, DC, DACNB Ian Hebeisen Dr. Amy Lawson Moore Toni Popkin Ed Roth 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**

Paul Markow Audrey Nicole Photography Amy Zellmer

**PUBLISHER** Faces of TBI, LLC

#### **FOLLOW US ONLINE!**





TWITTER @brainhealthmag



# Contents 04 TBI and Neuroer



#### Neuroendocrine Disorders

06 Manage an Amygdala Hijack in 3 Steps

> Hormonal Imbalances Post TBI

**ON THE COVER Brain Injury** Survior and Son

The Spoon Theory

The Gut-Brain Connection

Hormones and **Brain Function** 

The Challenges of Cooking and Recipes

**Hormones Often** the Culprit

The Zac 26 **Easter Story** 

COVER PHOTO: PAUL MARKOW

The Brain Health Magazine© (ISSN 2688-6065) is a bi-monthly publication with 6 issues each year. To order a subscription, visit www.thebrainhealthmagazine.com. For address changes or advertising information, please email: hello@thebrainhealthmagazine.com.

2000 Forest Street | Hastings, MN 55033 | www.thebrainhealthmagazine.com

DISCLAIMER: THIS MAGAZINE DOES NOT PROVIDE MEDICAL ADVICE

All content found in this magazine including: text, images, or other formats were created for informational purposes only. The Content is not intended to be a substitute for professional medical advice, diagnosis, or treatment. Always seek the advice of your physician or other qualified health provider with any questions you may have regarding a medical condition. Do not disregard, avoid, or delay obtaining medical or health related advice from your health-care professional because of something you may have read in this magazine. The use of any information provided on this site is solely at your own risk.

If you think you may have a medical emergency, call your doctor, go to the emergency department, or call 911 immediately. The Brain Health Magazine, Faces of TBI, LLC, their team, or editorial board does not recommend or endorse any specific tests, physicians, products, procedures, opinions, or other information that may be mentioned in this magazine. Reliance on any information provided by The Brain Health Magazine, Faces of TBI, LLC, their team, or editorial board, contracted writers, or medical professionals presenting content for publication to The Brain Health Magazine is solely at your own risk.

This information is NOT intended as a substitute for the advice provided by your physician or other healthcare professional.

Results presented in our magazine are specific and not typical. Articles are submitted by contributors and do not necessarily reflect the views of The Brain Health Magazine, Faces of TBI, LLC, their team, or editorial board. This information is not intended to replace or be a substitute for conventional medical care or encourage its abandonment.

Things stated or posted on our sites or made available by us are not intended to be, and must not be taken to be, the practice of medical care or the provision of healthcare treatment, instructions, diagnosis, prognosis, or advice. This magazine may contain affiliate links.

©2022 Faces of TBI, LLC

#### **FROM THE EDITOR**

# **NEW BEGINNINGS**

t's a new year, a new start, and maybe even a new shift in your mindset. January 1st marks the beginning for new opportunities, a new chapter of your life, and possibly a new chapter in your recovery.

This issue is all about hormones, and I hope it will give you a fresh perspective on your symptoms and some answers on how to combat them.

Traditional healthcare providers often overlook and underplay hormones. They will do a general blood test and tell you your hormone levels are "normal" ... raise your hand if you can relate!

Yet, traditional blood tests don't give us all the answers and are too generalized, meaning what might be normal for one person isn't normal for the next. The ranges are too broad, and even if you're at the end of a range, most doctors will say you're still "within normal" so you have nothing to worry about.

Meanwhile, you're left struggling with brain fog, hot flashes, abnormal periods, feelings of rage/anger, and so many other symptoms doctors try to tell you are just mental health issues. Now don't get me wrong, everyone needs a good mental health therapist. However, the root problem lies much deeper than that. And all the therapy in the world won't fix a hormone imbalance.

Hormone imbalance is even more overlooked for males, especially since men don't typically think about their hormones — they don't have a monthly reminder of how their bodies shift and change from day to day. Yet men can have off-the-chart hormonal problems (particularly anger or emotional issues). As you will find in the following pages, you can definitely find doctors out there to help you address your hormone concerns ... and far more accurate tests exist, such as the Dutch (Dried Urine Test for Comprehensive Hormones) Test. While these tests may not be covered by insurance, they will give you better answers than the blood panel the doctor ran at the clinic and told you looked "normal."

I hope you find some answers and begin to feel validated. I know how frustrating this journey can be, especially when we're taught our entire lives to blindly trust doctors. Yet the truth is they don't know everything. They simply can't. When it comes to brain injury, many are woefully behind in their education, which proves incredibly dangerous for the patients who they tell are fine, and their problems can't possibly still be related to their concussion.

#### Demand answers. Find the right doctors.

They truly DO exist, and they WANT to help you get better and back to a functional way of life! &

AMY ZELLMER, EDITOR-IN-CHIEF @amyzellmer

### **The Connection Between** *Traumatic Brain Injury and Neuroendocrine Disorders*

n the early 1900s, the consensus was that pituitary damage was a rare consequence of TBI. However, over the last 15 years, a significant body of evidence has emerged demonstrating that post-traumatic hypopituitarism (PTHP) is a common and clinically significant consequence of TBI.

Unfortunately, PTHP can masquerade as a postconcussion syndrome and be overlooked, leading to delayed recovery and impaired rehabilitation. As well, vague symptoms and no agreed-upon screening standard for PTHP has led to a significant under-diagnosis of this debilitating condition.

"[O]ver the last 15 years, a significant body of evidence has emerged demonstrating that post-traumatic hypopituitarism (PTHP) is a common and clinically significant consequence of TBI."

Researchers believe a vascular injury (ischemia or hemorrhage) is the most likely mechanism as autopsy studies have demonstrated pituitary infarction in up to 43% of fatal TBI cases. The hypophyseal vessels are anatomically vulnerable to shearing injuries and raised intracranial pressure, especially with anterior base-of-skull fractures.

The pituitary gland is a small gland that sits in the sellaturcica ("Turkish saddle"), a bony hollow in the base of the skull, underneath the brain and behind the bridge of the nose.

The pituitary gland has two main parts: the anterior pituitary gland and the posterior pituitary gland. The gland is attached to a part of the brain called the hypothalamus, which controls the activity of the pituitary gland.

The anterior pituitary gland is connected to the brain by short blood vessels. The posterior pituitary gland is actually part of the brain, and secretes hormones directly into the bloodstream.

# The anterior pituitary gland produces the following hormones:

- Adrenocorticotropic Hormone (ACTH): stimulates the adrenal glands to secrete steroid hormones like cortisol.
- **Growth Hormone:** *regulates growth, metabolism, and body composition.*
- Luteinizing Hormone (LH) and Follicle Stimulating Hormone (FSH): also known as gonadotrophins, act on the ovaries or testes to stimulate sex hormone production, and egg and sperm maturity.
- **Prolactin:** *stimulates milk production.*
- **Thyroid Stimulating Hormone (TSH):** *stimulates the thyroid gland to secrete thyroid hormones.*

#### Two hormones are produced by the hypothalamus, and then stored in the posterior pituitary gland before being secreted into the bloodstream:

- Anti-Diuretic Hormone (also called vasopressin): controls water balance and blood pressure
- **Oxytocin:** *stimulates uterine contractions during labor and milk secretion during breastfeeding*

#### Between the anterior pituitary and the posterior pituitary lies the intermediate pituitary gland. Cells here produce:

• Melanocyte Stimulating Hormone (MSH): *acts on cells in the skin to stimulate the production of melanin.* 

#### **BY DR. TATIANA HABANOVA**

Since the pituitary gland produces nine different levels. All hormones, any alteration to its function leads to a myriad all TBI pa of complications such as fatigue, myopathy, cognitive injury has

difficulties, depression, and behavioral changes, but can also have life-threatening complications such as sodium dysregulation and adrenal crisis.

As well, studies show a clear association between pituitary dysfunction and adverse cognitive outcomes, such as memory, attention, language, physical conditioning, and mood disorders. PTHP can also lead to dyslipidemia, hypertriglyceridemia, adiposopathy, insulin resistance, reduced quality of life, and increased risk of premature cardiovascular death from endothelial dysfunction and atherosclerosis.

"Since the pituitary gland produces nine different hormones, any alteration to its function leads to a myriad of complications such as fatigue, myopathy, cognitive difficulties, depression, and behavioral changes."

Currently, the consensus among researchers is early assessment of PTHP during the acute phase of a brain injury is unnecessary due to wide fluctuations of hormonal levels. Although 3–6 months post TBI, doctors recommend all TBI patients irrespective of the severity of the initial injury have their adrenal, thyroid, and gonadal axes assessed. Due to GH deficiency post-TBI being transient, deferring GH assessment until one year post-TBI is suggested.

If any deficiencies are detected, replacement therapy is suggested to begin immediately. Evaluation of pituitary function on an ongoing basis after TBI is paramount to determine if early deficiencies have recovered.

Endocrine evaluation and management should be a part of standard multidisciplinary care for these patients. A comprehensive assessment of the pituitary function should be undertaken as partial or complete pituitary dysfunction affects 33-50% of all TBI survivors and is a significant contributor to the overall disability burden.

Clinicians involved in the management of TBI patients should consider hypopituitarism and its impact on long-term morbidity.

**Dr. Habanova** is the host of Brain Health Savvy, a weekly podcast that inspires listeners through real conversations on all things pertaining to women's brain health. She transforms women in simple, yet real ways, encouraging them to seek their true potential, to be fierce and unapologetic while leading from authenticity, and to embrace change as they buck societal norms in favor of better brain health. www.drhabanova.com



Want to learn more about Amy's journey? Purchase her books on Amazon!



"Amy is a prime example of how powerful and life-changing combining personal experience, passion, and advocacy can be." — **Ben Utecht**, 2006 Super Bowl Champion and Author

# **The Stress-Learning Connection:**



ith dreams of attending a top-ranked college, you need very high scores on both sections of the entrance exam. For months, you study and prep and study some more for the SAT. You are ready on test day. This day will determine your life's course. As you take your seat, you notice your palms are sweaty, and you feel your heart pounding in your chest. When the test begins, your mind goes blank. You find yourself unable to remember anything you studied. Even the easiest math questions are impossible to answer. You are now breathing fast and feeling nauseous. You put your pencil down, run out of the room, and collapse in a puddle of tears. What's happening?

That phenomenon is called the amygdala hijack and can happen anytime we experience an extremely stressful situation. The amygdala is the emotional filter for the brain. It responds to a stressor in less than a second by signaling the adrenal glands to release two hormones called cortisol and adrenaline. Once the stressor releases those hormones, the amygdala overrides the prefrontal cortex where all the higher-order thinking occurs. Cognition, learning, problemsolving, and even accessing memories are all inhibited. In other words, the amygdala hijacks the brain.

Although this response is useful when you need to flee quickly from a physical threat (like outrunning a bear), the amygdala hijack can be detrimental to our functioning in everyday stressful scenarios like the one described above. While we can't do much to recover the logical thinking part of the brain while emotions hijack it, we can learn to shut it down so that we can more quickly re-engage our frontal lobe. Or, if we are thr parent in the case above, we can teach our kids how to manage this extremely frustrating phenomenon.

#### Here are the three steps to regaining control:

#### **Recognize the Hijack**

The first step in regaining control of the thinking part of the brain is to recognize when the amygdala hijacks it. Psychiatrist and author Dr. Daniel Siegel says it's important we "name it to tame it." That is, once we acknowledge the emotion and say it to ourselves (or someone we trust), we've completed the first step toward reclaiming our prefrontal cortex. For example, the student taking the SAT might recognize the sweaty palms and rapid heartbeat were signs of high stress, and then stop to think, "I've been triggered, and I'm feeling scared."

#### **Clear Your Mind**

Irrational thoughts will spin in our minds when the amygdala is in charge. These thoughts can lead to behaviors we may regret later, so it's important to get rid of them as quickly as possible. Neuroanatomist Dr. Jill Bolte Taylor says it only takes 90 seconds to regain control if we let the process play out without engaging in it. She tells us the chemical process that triggered the amygdala hijack will be over in 90 seconds, and we can wait it out. Any leftover emotions after 90 seconds are actually a choice, not biologically determined. That's great news! Sitting with strong emotions without acting on them takes practice, but comes with great reward once we've mastered the ability to ignore those irrational thoughts.

#### Breathe

We hear over and over the importance of learning mindful breath work, but how many of us actually try it? Maybe more of us would if we knew how it helps. When the amygdala is in charge, oxygen is diverted to it and away from the frontal lobes responsible for logical thinking. Deep breathing will help bring oxygen back to the frontal lobes! You can explore dozens of helpful breathing exercises to find one that's most comfortable for you. An easy one to get started with is called 4-7-8 Breathing. Sit with your back straight and inhale through your nose to a count of 4, hold your breath for a count of 7, and exhale through your mouth for a count of 8. Repeating this cycle five times takes 95 seconds—five seconds longer than the time takes for the amygdala hijack to expire. How convenient!

Understanding the phenomenon of the amygdala hijack can help us (and our kids) approach it with intentionality rather than allowing it to continue interfering with rational thinking and learning. Regardless of the source of stress, the ability to have a sense of control over the biological response to the stressor can be life-changing for people of every age.  $\lambda$ 

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



### HORMONAL IMBALANCES POST TRAUMATIC INJURY LEGAL CORNER BY JAMES A. HEUER



The brain is the key instrument to regulating hormones in our bodies. As a result, damage to any part of the brain that releases and monitors hormones disrupts the ability to maintain stability. Physical, emotional, and psychological issues can arise due to either hormone insufficiency or overproduction.

Small structures at the base of the brain are responsible for regulating the body's hormones. When these areas of the brain become damaged, either an increase of one or more hormones or an insufficient release of hormones may occur. This results in what is called homeostasis. Homeostasis is the body's system of monitoring and regulating its internal environment stability and bodily functions including temperature, thirst, hunger, and sleep/wake cycles.

The endocrine system is affected after a TBI. Often, the hypothalamus and/or pituitary gland are damaged. The hypothalamus and pituitary gland are both small parts of the brain responsible for hormonal regulation. These

Continued ...

parts of the brain tell other endocrine glands throughout the body to make hormones. The more severe the TBI, the higher the chance for these hormonal problems to occur.

#### "[D]amage to any part of the brain that releases and monitors hormones disrupts the ability to maintain stability. Physical, emotional, and psychological issues can arise due to either hormone insufficiency or overproduction."

In the early stages post TBI, hormonal problems can cause a condition known as diabetes insipidus (not to be confused with diabetes), which is an excessive production of dilute urine and increased thirst. This condition occurs from a reduction in the production and secretion of hormones. The problem may be treated with an antidiuretic medication, but in some cases requires lifelong hormone replacement therapy.

Hypopituitarism can be diagnosed later in TBI recovery. Hypopituitarism is a condition that occurs following the damage to the pituitary gland, resulting in a reduction in hormone production. In the early stages of a TBI, the hormone levels are severely affected, so it's difficult to diagnose hypopituitarism. The option to run hormone level tests is highly recommended, and your doctor may recommend a brain scan to look for damage to the hypothalamus or pituitary gland.

What are the symptoms of hypopituitarism?

- Depression
- Sexual difficulties
- Mood swings
- Fatigue
- Vision disturbance
- Headaches

The pituitary gland, "the master gland" located in the base of the brain consists of two parts. A brain injury to this area is not always apparent on visual examination, but can still affect its function by damaging the neurons and blood vessels. Damage to the pituitary gland may lead to reduction in hormone production.

Blood tests of dysregulation are recommended as you may find resistance from a doctor who believes the symptoms are unrelated to hormones. If the tests come back normal, sometimes doctors discount the issue. Endocrinologists should run the hormone level tests. Tests measuring cortisol levels and measuring at the right time because they vary throughout the day are important. Adrenal insufficiency can be diagnosed as primary, secondary, or tertiary adrenal. The symptoms include low energy, depression, anxiety, low blood pressure, and anemia.

Primary is when adrenal glands don't make enough cortisol and aldosterone because the glands are damaged, usually permanently. Secondary is when the adrenal glands won't make enough cortisol. Lastly, tertiary adrenal is when the hypothalamus doesn't create enough corticotrophinreleasing hormone.

#### Identifying hormone dysregulation starts with keeping an eye on your energy levels, growth problems, and changes in body temperature.

- You may experience decreased energy or increased fatigue.
- Growth problems can result in anomalies in your bone growth, and, therefore, your height.
- The changes in your body temperature may mean you feel too hot or cold.
- You may notice skin and nail changes such as brittle nails and dry skin.
- You might experience unexplained weight change or hair loss and thinning.
- Lastly, you may have problems with memory and concentration.

After the diagnosis of hormonal issues post-TBI, getting the correct individual treatment is important. Hormone replacement therapy is used to restore hormones to normal levels. Start the treatment as quickly as possible after diagnosis, although some symptoms may not appear immediately after the TBI. In some cases symptoms may take weeks, months, or even years to arise. Recent research shows the hormonal imbalance issues reduce over time in a number of TBI survivors. TBI survivors must pay attention to their body and be aware of the symptoms to progress in TBI recovery and the proper treatment plan.

"Hormone replacement therapy is used to restore hormones to normal level. Start the treatment as quickly as possible after diagnosis, although some symptoms may not appear immediately after the TBI. In some cases symptoms may take weeks, months, or even years to arise." &

James A. Heuer, PA is a personal injury attorney helping individuals with TBI after suffering one himself. He is located in Minneapolis, Minnesota. Are you living with a TBI caused by someone else's mistake?



Attorney

The Heuer Fischer team of lawyers and nurses have over 80 years of experience.

### OUR OFFICE

Email: jaheuer@callhlf.com www.heuerfischer.com 10 S. 5th Street Minneapolis, MN 55402



Heuer

Fischer

CALL NOW! 612-333-3160

Jonathan Fischer

# Brain Injury Survivor and Son

Share Road to Recovery

PHOTO BY PAUL MARKOW



azoshay Marie is a familiar face in the brain health community. As a brain injury survivor, she actively participates in survivor groups, caregiver conferences, and empowerment events in Arizona.

As a result of her advocacy and speaking, many in the community know the story of that horrific day in 2017 when a car hit Cazoshay as she moved through a pedestrian crosswalk in downtown Phoenix. The car threw her 15 feet in the air and 100 feet ahead. She landed, unable to move, on the hard concrete road. The driver stopped, surveyed the situation, but never got out of his car. The driver still remains unidentified.

Six months before the accident, Cazoshay moved from Anchorage, Alaska for a new start. Within seconds, the professional speaker and wellness lifestyle blogger's life changed. Behind the physical injuries to her fibula, jaw, and nerves, she sustained a traumatic brain injury (TBI) with even more afflictions hidden. To this day, she battles chronic pain, frequent migraines, issues with her neck, nerve damage, impaired vision, and loss of short-term memory.

"Behind the physical injuries to her fibula, jaw, and nerves, she sustained a traumatic brain injury (TBI) with even more afflictions hidden. To this day, she battles chronic pain, frequent migraines, issues with her neck, nerve damage, impaired vision, and loss of short-term memory."

But while she recovers, another person travels a parallel journey every step of the way — her son, Nate.

Only 11 at the time, Nate wasn't with his mother when the accident occurred. But the second he heard about it, he became alarmed. "I was terrified," says Nate. "In that moment, my world collapsed around me. I was filled with dread and terror.

"I honestly thought she would die, and I'll never have a mother."

Over the next three weeks, he saw she would survive, even though it would take some time to recover from her physical wounds. As the kind of kid who always wants to help, Nate jumped right in. "I did more chores without being asked, including helping with cooking and cleaning."

Cazoshay experienced mixed feelings when she saw the effort her son made. She recalls, "As his mom, I felt bad

that he felt as though he needed to grow up quicker in order to help me. As a single parent, I used to do everything myself and suddenly, it wasn't that easy."

The toll the TBI and nerve damage took on Cazoshay made things exceedingly difficult. Nate recognized her recovery meant more than what met the eye.

"I would tell her something, and she wouldn't remember what I had just said. When this happened over and over, I thought maybe there's something going on inside her. I saw how hard it was for her to process our conversations, and there was nothing I could do about it."

In retrospect, Nate says his friends really did not know how to support him, a common occurrence for the family members of survivors of any age. He could talk to his uncle and grandmother, who were present during his mom's initial recovery, but he couldn't confide in his peers. "I tried talking to friends, but instantly regretted it. They hadn't experienced brain injury and didn't understand. They would say things like, 'Can't she just have surgery and get better?'

"I really resented that they tried to make light of the situation." In response to their insensitivity, he tried to lift his sagging spirits by drawing, listening to music, and playing on devices. Then Nate and his mother both went into therapy.

#### "As his mom, I felt bad that [Nate] felt as though he needed to grow up quicker in order to help me. As a single parent, I used to do everything myself and suddenly, it wasn't that easy."

"Our counselor got us to discuss the accident and express our feelings about things. I was angry at the person who hit her. He never even got out of his car. I mean, I believe in forgiveness, but I don't know if I can ever really forgive him for his actions," claims Nate.

Cazoshay feels similarly. "I do express anger sometimes. He was the only driver who didn't stop in the crosswalk. He just left me there, bleeding in the street, and didn't even get out of his vehicle.

"I was very concerned about Nate, how he would come out of all this. He's okay, but sometimes I can see that it still affects him." Her biggest regret? Missing five years of watching her son play basketball, flag football, and lacrosse.

Continued ...

"There are amazing resources out there that can help you connect with others with brain injury. [The Brain Health Alliance] is a fantastic outlet to share your story, educate others, and heal, no matter how severe your injury or prolonged your recovery."

# As both recover from the accident, several things become apparent:

#### The first is the need for support.

Cazoshay became passionately involved in several of the Brain Injury Alliance of Arizona's programs, including the Unmasking event that uses art to help survivors express themselves. Among other activities, she also spoke at the annual Rays of Hope survivor conference and participated in various support groups. Cazoshay and her son travel with the Brain Injury Alliance CEO to talk with graduating occupational therapy students at major universities, aiming to instill in them the human aspect of healing from the invisible disability.

"There are amazing resources out there that can help you connect with others with brain injury. It's a fantastic outlet to share your story, educate others, and heal, no matter how severe your injury or prolonged your recovery."

Carrie Collins-Fadell, CEO of the Brain Injury Alliance, noted that healing — both spiritually and physically — is often a family affair. Collins-Fadell says, "Cazoshay is a bright light, illuminating the way for so many others. Like many survivors, her life changed in a moment. The way she and her son Nate share their story so openly, they continue to give back even when they themselves are still healing."

#### Second, they encourage patience.

Now 15, Nate explains, "I just wanted her to get better right away. I learned that's not how it works. That's what my friends didn't understand and, really, neither did I. Just because the disability is invisible doesn't make it any easier. In fact, it's harder. Everybody's recovery is at their own pace."

Cazoshay agrees. "You have to remember progress can take years, not days. Eventually, you see results."

#### Third, go easy on yourself.

Nate recalls those first months after the accident. "I used to think, why did this happen to me at this time of my life? Out of all the millions of things, why me and my mom? I was surprised by how intense my feelings were. It was like being hit by an emotional car."

Cazoshay cautions, "Don't try to take on everything, even if the parent can't do as much. Kids should talk about how they feel. Nate held it in. Don't push until your child is ready; it's a process. I would always ask him how he felt and let him know it hurt me to see him hold it in. It's ok to feel anger."

Nate remembers, "At first, I tricked myself into feeling fine. I was very hopeful about her being better, getting into a more normal state. It just takes time."

#### Finally, never give up hope.

"It doesn't help to judge yourself against who you were or want to be," says Cazoshay. "I may experience migraines, memory loss, blurred vision, and dizziness, but we still have a life. I still speak, share on social media, create art, and blog as I am able. And Nathaniel is a wonderful son."

Today, Nate participates in fencing while getting good grades in high school. "I help whenever I can, but I also know that I need down time and watch out for my own well-being."

Nate sees the new version of his mom and beams, "I'm so proud of her." &



**Ed Roth** was raised in Chicago and has had a long and diverse career in the entertainment and media industries. He currently resides with his family in Scottsdale, Arizona, where he enjoys playing tennis year-round.

### THE SPOON THEORY and Having a Traumatic Brain Injury



**BY TONI POPKIN** 

any people have heard of "The Spoon Theory" by Christine Miserandino (www.butyoudontlooksick. com). She wrote the article to explain what living with a chronic invisible disease is like.

I have a Traumatic Brain Injury (TBI); more correctly I've had four — three from cars crashing into mine (none my fault), and the most recent from passing out and hitting the front of my head full force on the door. I use to use an analogy of money in the bank to explain how I and other TBI survivors who look fine can be out in public one day doing something, and then "paying the price" for days afterward. My explanation goes something like this:

Think of my energy as money, either cognitive or physical. I have X amount of money in my bank account. Everything I do uses much more than someone who has not had a brain injury. Actually, due to the cumulative effect, 1+1+1 does NOT equal 3; I'm using a ton more with everything I do. If I have only taken out of my bank account without putting back into it through rest, water, good nutrition, and quiet time, my account becomes overdrawn. Then I have to pay a penalty, usually a large one.

That lunch you saw me at with friends — those two hours took about two days' worth out of my account. And I'm not counting showering, deciding what to wear, driving there, or using a cab if I'm tired. Restaurants have a ton of noise. Most people can tune it out or aren't even aware of it. My brain amplifies it. Then you have several conversations going on at the table. The music is booming. Children are screaming. The menu has tons of things to read in order to choose what to eat.

Now to how this ties in with The Spoon Theory: Like someone with a chronic invisible disease, my invisible injury makes it hard for people to really, really put themselves in my shoes and understand what I mean when I say I'm on overload from doing what a "normal" person doesn't find taxing. Or why on some days I'm able to go somewhere and on another am not able to go to the exact same place: I've used everything in my account already. The problem arises when, to look at me most of the time, you would think I'm fine unless you know what signs to look for.

For a moment, try pretending you are in the shoes of someone with a TBI. If it would cost you one spoon to do any of these things (or maybe none), multiple that by three or four for someone with a TBI. Some days an activity will cost us more to do than doing the same one on a different day. See how many spoons you would use in my shoes.

The next time you see someone you know who has had a Traumatic Brain Injury, please don't say "I do that too" when they tell you they forgot something or whatever. It's not the same. Those with TBIs do it because they have nothing left in their account or no spoons left for the day. You, on the other hand, do it as part of a normal aging process. TBI survivors don't want sympathy; they only want people who they care about to understand and try to accept this is their reality. &

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.



### **THE GUT-BRAIN CONNECTION**

Through the Lens of Traumatic Brain Injury



BY JONATHAN CHUNG, DC



Although chiropractic is generally associated with bad backs and tight muscles, most chiropractors have a deep-seated interest in the connection between the brain, the immune system, and the gut. While no hard studies are available on the topic, some authors are looking at this connection to see if the gut-brain axis may be a link between head injuries and neurodegenerative disease. This specific topic actually ties into all my scientific interests in one shot, so I hope you'll get a lot from some of the extra content I'm going to try to lay out in this article.

#### A Tale of Two Brains

Almost everyone is aware of the importance of the brain in your head, but a staggering number of neurons also exist in your gut. This bundle of nerves in the gut is collectively known as the enteric nervous system (ENS). An estimated 500 million neurons exist in the gut, exceeding the number of neurons in the spinal cord, making it second only to the brain in terms of neural density. This has led some scientists to affectionately call the ENS the "second brain," so maybe making "gut" decisions might not be such a terrible thing (that's a joke).

"The gut produces about 90% of the total serotonin in the body and about 50% of the body's dopamine, which can have major implications in the function of the brain and mood." The number of neurons in the gut might actually be the second most interesting thing about the ENS. The most interesting thing is the ENS can actually function without talking to the brain if it needs to. The gut has its own set of interneurons and integrating centers to let it carry out reflexes and functions without the help of the brain. In normally functioning humans, the brain does talk to the gut through the vagus nerve, but the vagus nerve can be severed, and the gut will continue to work on its own power.

The gut is also a MAJOR producer of the body's neurotransmitters, which are the chemical currency of the nervous system. The gut produces about 90% of the total serotonin in the body and about 50% of the body's dopamine, which can have major implications in the function of the brain and mood. We'll get into the importance of that a little later.

#### Shields Down: The Gut and the Brain Barrier

The brain and the gut also contain some similarities in both having physiological barriers that have been topics of high interest for neurodegenerative disease.

The gut's barrier keeps potentially harmful substances from getting IN your bloodstream, while the brain's barrier keeps harmful substances in the blood OUT of the brain. The barrier in your brain is called the blood-brain barrier, and disruption of this barrier is associated with a host of neurological disorders

Intestinal permeability, also known as leaky gut, is also well supported in the literature as a driver of systemic inflammation, but has been subject to a lot of abuse from various practitioners overstating its prevalence and significance. While not everything is leaky gut, and not every leaky gut needs an intensive supplement regimen, intestinal permeability is a real phenomenon with the potential to create conditions in the gut like celiac, inflammatory bowel disease, and metabolic syndrome.

#### "The gut's barrier keeps potentially harmful substances from getting IN your bloodstream, while the brain's barrier keeps harmful substances in the blood OUT of the brain."

Losing these barriers is like losing a layer of defense, which can make your body more prone to attack from disease causing agents, or even the cells of your own immune system.

#### Neuroinflammation: Collateral Damage from your Body's Defenses

We have these barriers in our gut and our brain that help prevent harmful substances from getting into our blood and our brains. We know when these barriers get disrupted, our body is more susceptible to threats from outside the body. However, the increased permeability of these barriers may be the major driving force in threats from the INSIDE of the body.

"Autoimmune reactions are worth paying attention to because many neurodegenerative disorders seem to have a link to the brain being exposed to chronic neuroinflammation, and surely chronic traumatic encephalopathy would fit that bill."

Our immune system is made up of several classes of white blood cells and proteins patrolling the body looking for any bacteria, viruses, parasites, fungi, or other organisms that may potentially harm us. While the immune system does a remarkable job protecting us, scenarios can arise when the immune system accidentally does the body harm. This is the case in autoimmune disorders like multiple sclerosis, rheumatoid arthritis, Grave's Disease, and Crohn's Disease.

The presence of these autoimmune reactions can be the result of an immune system that isn't regulated properly or has accidentally built antibodies that inadvertently attack the body's own tissues. When you have a leaky gut, these immune cells can get primed to attack compounds that don't normally harm the body (think gluten or food allergies). When there is a leaky blood-brain barrier, these immune reactions can occur in the brain and spinal cord — which normally tries to keep inflammation OUT. When these reactions occur in or around the brain, they can cause neuroinflammation that may gradually deteriorate brain tissue. Some authors suggest post-concussion syndrome may be a form of an inflammatory brain illness, but that hypothesis hasn't been studied extensively yet. Autoimmune reactions are worth paying attention to because many neurodegenerative disorders seem to have a link to the brain being exposed to chronic neuroinflammation, and surely chronic traumatic encephalopathy would fit that bill.

#### Microglia: When the Brain's Helper Cells Go Rogue

Your brain is loaded with non-neuronal helper cells called glia. Glia support the neurons in your brain by providing protection, insulation, and repair whenever needed. They take up a huge chunk of brain material and actually outnumber neurons in the brain by a factor of 10.

A special type of glia exists in the brain called microglia. Microglia are macrophages that help clean dead or unnecessary debris hanging out in the brain. They play a role in protecting the brain from infections, but they also do really cool things like prune unused synapses, or get rid of and clean dead brain cells after injury.

Like most immune cells, their default setting is turned to the off switch. You don't want overly active immune cells, otherwise they create excessive inflammation. When infections or injuries arise, these cells become primed and active to help initiate the cleaning and repair inside the brain.

This means they start eating away at dead cells and recruiting other immune cells to create inflammation. Shortterm inflammation is essential to healing, so we need these cells to generate inflammation for short periods of time while tissues heal. But sometimes, when a cell gets turned on, the off switch gets broken and it stays on, leading to chronic inflammation.

Chronic activation of microglia has been implicated in multiple neurological diseases with autism, MS, and Alzheimer's disease chief among them.

# The Vagus Nerve: The Bridge for the Gut-Brain Connection

The vagus nerve is a specialized nerve that comes off the brainstem and is connected to many of the body's vital organs. It has a particularly important role in the gut-brain axis because it is a primary conduit for the brain in your gut to talk to the brain in your head.

This becomes really important when we consider the brain acts as a biological thermostat for multiple functions in the body, including regulation of the immune system. Changes in your gut bacteria can dictate inflammation in the brain and brain damage can influence gut permeability. Many scientists suspect the vagus nerve is a central player in these phenomenon.

How important is this bridge? Some evidence suggests the vagus nerve may be a conduit for how rogue proteins in Parkinson's disease can spread into the brain.

Continued ...

#### Concussions: Disrupting the Barriers and Stirring the Pot of Inflammation

So now it's time to put it all together. How does something like a concussion affect this entire system? Two recent review papers have gone into this concept with some detail, but here are the big ideas:

- Traumatic brain injury can cause dysautonomia resulting in poor functionality of the vagus nerve and poor motility of the gut.
- Animal models have shown experimentallyinduced brain injury can lead to more porous gut permeability within three hours of TBI.
- TBI disrupts the blood-brain barrier.
- TBI will lead to priming of microglia and neuroinflammation. Structural signs of brain injury are correlated to the amount of microglia primed in the brain.
- A disrupted gut lining after TBI is more susceptible to rogue bacteria infiltrating the bloodstream and creating systemic inflammation. Systemic inflammation can further impact the brain's microglia promoting more neuroinflammation long after TBI.

In a worst-case scenario, the disruption of the gut barrier and the brain barrier allow for a persistent cycle of systemic inflammation and constant activation of brain microglia.

Do we know if this happens in humans yet? Truthfully the answer is no. So far, no experiments have looked at this relationship, so it's too early to say if this is a real phenomenon that can tie together brain injury and neurodegeneration.

# So what probiotic should I take after a concussion?

The natural question after reading this is "What type of treatment do I need after a concussion? "

When we talk about guts, the usual line of thinking leads to probiotics, but that probably won't lead us to the answers people with brain injuries really need.

Remember that big cast of characters we talked about before we addressed the topic of concussion? Here's a refresher:

- The brain
- The "brain" in your gut (enteric nervous system)
- Intestinal barrier
- Blood-brain barrier
- Microglia
- Vagus nerve

Brain injury is a multi-faceted injury with wide effects on numerous parts of the body. No magic potion will specifically hit everything in a positive way. Here are some ways we've seen patients improve with problems in the gutbrain axis:

- Cervical, vestibular, ocular rehabilitation with graded exercise is becoming the gold standard in concussion recovery
- Cardiovascular exercise to improve hippocampal and global neuroplasticity
- Correction at the craniocervical junction to improve cerebrospinal fluid dynamics, decrease stress on the blood-brain barrier, and improve circulation of neuroinflammatory compounds
- Vagus nerve stimulation to improve neuroplasticity, decrease systemic inflammation, and increase gut repair
- Neurofeedback for plasticity and to improve parasympathetic tone
- Pre- and probiotics to repair gut permeability
- Ketogenic/fasting type diets to decrease neuroinflammation and alter gut biome
- Reduction of common dietary gut irritants

We could add a lot more to this list, but these are some of the most common things we see that can help some of the more challenging patient presentations.

Will these therapies stop or prevent neurodegenerative diseases? We can't say for sure, but they all tend to improve the lives of people with early signs of neurological deterioration. Time will tell if this can impact the brain injury population as a whole. &

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

# THE BRANN HEALTH





Get your FREE digital subscription at www.thebrainhealthmagazine.com

# Hormones and Brain Function



#### BY DR. SHANE STEADMAN

ost people understand changes in hormones can cause changes in brain function. These changes most often affect a person's mood and libido, but hormones vastly impact the metabolic function and brain. When the topic of hormones is mentioned, many people only think about estrogen, progesterone, and testosterone. But many other hormones, such as cortisol, thyroid hormone, DHEA, and insulin — just to name a few influence our brains.

"When disruption of [the brain/ body] interplay takes place, it affects our relationship with others, the ability to focus, development, and the aging process."

Hormones are involved in neurochemistry, neurotransmitters, and neuroinflammation. They also control and regulate many functions in the brain. An important note is the brain sends signals that tell your body when to produce hormones and how much to produce. This brain/body interplay is seen daily in how we interact with others and our environment. When disruption of this interplay takes place, it affects our relationship with others, the ability to focus, development, and the aging process. When hormonal imbalance occurs, people often describe symptoms such as brain fog, migraines, decreased sleep, decreased memory, depression, and anxiety. Finding the cause of hormonal imbalance can be difficult and often involves a long list of possibilities to choose from. The cause of hormonal imbalances can range from stress, infections, liver dysfunction, or gut dysfunction to dysglycemia. The big picture is that everything can influence hormones, and hormones affect every cell in the body.

"When hormonal imbalance occurs, people often describe symptoms such as brain fog, migraines, decreased sleep, decreased memory, depression, and anxiety."

#### Inflammation

Inflammation, commonly referred to as brain fog, is the most common complaint described after car accidents, TBIs, stress, hypothyroid conditions, diabetes, and more. Hormones have a significant impact on microglia cells in the brain. Microglial cells are part of the neuroinflammatory process, which can be seen with events like brain injuries and processes that activate the immune system.

Continued ...

"Inflammation, commonly referred to as brain fog, is the most common complaint described after car accidents, TBIs, stress, hypothyroid conditions, diabetes, and more."

Certain hormones play a role in immune modulation, or act as an anti-inflammatory. Evidence suggests estrogen, one of the more common hormones associated with modulating inflammation, plays a part in reducing microglial activities and modulating inflammation in the brain. This example can be seen during menopause when estrogen levels fluctuate or decrease, causing brain fog and decreasing memory during those years.

In addition, studies show progesterone can be neuroprotective, whereas high cortisol can lead to neuroinflammation. Hormones are much like "Goldilocks and the Three Bears:" Too much or too little can cause inflammation. Hormones need to be just right.

#### Neurotransmitter

Hormones impact different neurotransmitters in the brain. For example, progesterone can have a positive impact on GABA and dopamine — in other words, progesterone can influence moods including anxiety and depression. Estrogen positively affects serotonin, and testosterone affects dopamine. Other hormones, such as thyroid hormone, can impact a wide range of neurotransmitters such as dopamine, GABA, serotonin, glutamate, and acetylcholine. Therefore, those suffering from hypothyroid usually complain of memory problems, anxiety, depression, brain fog, and brain fatigue. With this knowledge, understanding how hormone imbalances can cause so many neurological symptoms is easy.

Hormones are very influential on brain function. As mentioned earlier, hormones can impact microglial cells, inflammation, and neurotransmitters. They can also impact the hippocampus, which works with memory, and the amygdala, which influences mood and anxiety, neuron signaling, and neurodevelopment in infants. Too often in medicine, hormones are placed in a box and not evaluated with other systems. Hormones need to be evaluated in conditions such as neurodegenerative disorders (i.e., Parkinson's and dementia), TBIs, and even psychiatric disorders. Experts use different approaches for testing, evaluating, and treating hormone problems. Within each approach, understanding the brain-hormone interplay and how supporting hormones can positively impact brain function are important.  $\clubsuit$ 

**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.



### **CAREGIVER CORNER**

# **The Challenges of Cooking,** and How to Look at Recipes



**BY IAN HEBEISEN** 

t the beginning of this year, I moved out of my parents' house and into an apartment in Minneapolis. Soon, I learned the true headache of cooking your own meals.

#### "[M]ustering the strength and brain power to complete the task [of making a meal] after a long day of work absolutely drains you."

Cooking is such an involved process, isn't it? You need to gather the ingredients, slice and peel the appropriate items, and grab an insane number of utensils you'll only need to wash later on. And, only after all that prep work, can you actually begin to cook and combine the food to create a legitimate meal. Challenging enough on its own, mustering the strength and brain power to complete the task after a long day of work absolutely drains you.

My mom never really enjoyed meal preparation, but after her traumatic brain injury, the task grew from annoying to detrimental. Every ingredient, measuring spoon, and spatula lives in its own little space in the kitchen, and taking the time to hunt down everything proved an exhausting task on its own, let alone cooking a fully balanced meal for five.

"[T]aking the time to hunt down everything [needed for a recipe] proved an exhausting task on its own, let alone cooking a fully balanced meal."

Continued ...



#### ... continued from previous page.

From my observations, a couple of key changes made cooking so much more difficult. The first is brain fog; the second is nerve damage.

When cooking, you often have to jump from one task to another. You might be whisking one thing, but then have to switch to slicing, and then stirring, performing multiple different tasks within a short span of time. It's easy to get overloaded and the brain fog to roll in, and my mom often needs to concentrate on one task at a time.

As far as nerve damage, cooking involves lots of meticulous manipulation of the fingers. You do everything with your hands: peeling onions, chopping parsley, cracking eggs, and so on. Each requires some level of finger dexterity, grip strength, and repeated arm movement. Sometimes when my mom does an intricate task like that, her nerves will flare up, causing her arms and legs to contract and contort painfully.

Even the kinds of foods my mom could eat changed. She always expressed a sensitivity to nitrates and certain preservatives, but after her car accident, she began developing allergies to peanuts, coconuts, and other nuts. Now, the only nuts she can eat without her throat swelling are sunflower seeds and pine nuts.

"[W]e all needed to adapt quite a lot. Cooking became even more of a group effort, sometimes with each of us planning and executing a different meal per week."

Needless to say, we all needed to adapt quite a lot. Cooking became even more of a group effort, sometimes with each of us planning and executing a different meal per week. Prepping food for the upcoming days beforehand became a routine Sunday activity: if my mom had meals ready to go for her lunch and dinner, she could save a lot of brain power and fight off unwelcome fatigue.

Now, batch cooking serves as a mini-family tradition. We gather at my mom's house, usually with a recipe we want to try. As one big unit, we divide and conquer the kitchen. Some of us are in charge of chopping, while someone else cracks eggs and measures ingredients, and another is in charge of dishes. We also read the recipes: the small print and random abbreviations confuse my mom and can lead to unnecessary headaches.

While prepping her own lunch for work proves challenging, having meals in storage containers she can grab on her way out the door makes her day much easier. In the evening, dinner is already prepared, waiting for someone to pop in the microwave — an instant home-cooked meal.

Throughout these endeavors, another lesson occurred to me. When helping my mom cook, it's better to focus on the things that she can do instead of the things she cannot. Being optimistic lightens the mood and creates a generally more positive experience when you look at the possibilities and pluses versus the obstacles.

"Being optimistic lightens the mood and creates a generally more positive experience when you look at the possibilities and pluses versus the obstacles."

This applies to every aspect of caretaking and adapting to a brain injury. Taking a step back and evaluating what's going right will help you see how far you've come.  $\aleph$ 

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:** Butterfly Pose

oga 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 almost anyone.

An important aspect of yoga is your breath. Connecting your breath to your body and getting oxygen flowing to your brain make yoga powerful for recovery. Yoga is also a time to quiet the mind and let anxiety and distracting thoughts drift away.



#### BY AMY ZELLMER, EDITOR-IN-CHIEF

Butterfly Pose (Buddha Konasana) increases hip mobility by stretching the deepest part of the hip muscles, as well as the inner thighs. The pose helps with grounding and calming the body and mind and also improves posture and body awareness.

#### Instructions:

- 1. While seated on your mat, bring the soles of your feet together, close to your pelvis. Allow your knees to fall out to the sides.
- 2. Ground your sits bones and lengthen your spine.
- **3.** Hold onto the outside of your feet and press the soles of your feet toward each other.
- 4. On an exhale, forward fold from the hips, keeping your spine long and your chest open.
- 5. Hold this pose anywhere from 1-10 minutes.
- **6.** To come out of the pose, gently sit up straight, lift your knees, and straighten your legs.

#### **Modifications:**

- Sit up on a cushion or folded blanket to make your hips higher than your knees.
- In a chair: place a block on the tall end in front of you and place your feet (soles together) on the block. Gently push down your knees with your hands to stretch your hips. You can stay in this position or forward fold as above.

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

# How to Tap Into the Power of

# LABRADORITE



**BY KRISTEN BROWN** 

#### **HEALTHY LIVING**

hen our bodies get out of balance physically, energetically, or emotionally, a connection to our hormones may be the cause. Several energetic pathways align with specific glands and organs that impact hormone levels. One powerful crystal that can help with hormonal balance is labradorite. The shimmery bluish grey stone reflects light in such a way that it's been dubbed "labradorescence." This type of light reflection actually comes from within the stone rather than the surface, giving it deep energetic powers ranging from hormone balance to mental clarity to protection from negativity.

## Here are three ways labradorite can boost your wellness:

- **1. Female Hormone Balance:** Lay quietly with a labradorite stone over your lower abdomen between your belly button and pubic bone. Envision orange light being reflected from within the labradorite back into your own female organs. This practice helps with abnormal menstrual cycles, heavy periods, and easing PMS and menopausal symptoms. Keep one in your pocket during those times of the month (or all the time).
- 2. General Energy Flow: Hold a labradorite in each hand. Imagine them sending a powerful energy into your

body. Feel them activating all your cells and flooding you with golden light that energizes your body, mind, and spirit. The stone can also be used when you need mental clarity, so keep one by your computer or take it to meetings when you need to think clearly and strategically.

**3. Positive Thinking:** When times get tough, your body can shut down as your mind and spirit process stress. Labradorite can strengthen the body when it's battling illness, change, or stress. Keep the crystal with you in your purse or wallet so you see and feel it regularly. Let it be a reminder to take a breath or two, feel a deep surge of energetic protection come from within, and see yourself moving forward in a positive way.

Whether you're going through hormonal changes in your life or just want to improve your general wellness (be sure to talk to your doctor too), labradorite is a multi-purpose crystal that can bring you much energy. The physical properties it has, along with the metaphysical power you can tap into, make it a must-have stone for your crystal collection.

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



#### BY AMY ZELLMER, EDITOR-IN-CHIEF

ssential oils are a complementary tool that can help you achieve a healthy lifestyle. They are easy to use, smell great, and are versatile.

Not all oils are 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.

#### Endoflex VitalityTM

Keep up with your overall wellness and day-to-day schedule with help from EndoFlex Vitality. In addition to the popular spearmint essential oil, EndoFlex Vitality features sage, geranium, myrtle, nutmeg, and German chamomile to create a unique blend that may support a healthy lifestyle.\* Adding this blend to your wellness regimen is as easy as combining the essential oil with a refreshing glass of juice or relaxing cup of tea. EndoFlex and EndoFlex Vitality are the same essential oil blend.

#### **FEATURES & BENEFITS**

- Has a minty-fresh, herbaceous, sweet aroma
- Features Spearmint, Sage, Geranium, Myrtle, German Chamomile, and Nutmeg essential oils
- Has an herbaceous flavor with a hint of mint

**Topical:** Dilute one drop EndoFlex oil with one drop V-6<sup>™</sup> or olive oil and apply to desired area as needed.

Aromatic: Diffuse up to one hour, three times daily.

Internal: Put 1-3 drops in a capsule and take as a daily supplement.\* Add it to a refreshing glass of juice or relaxing cup of tea to enhance your wellness regimen.\*

\*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. &

## TURKEY AND BROCCOLI STIR FRY

#### BY AMY ZELLMER, EDITOR-IN-CHIEF



#### What you need:

- 3.5 oz. (100g) black rice noodles
- 7 oz. (200g) turkey fillet, chopped
- 1 broccoli, diced into florets
- 1 tbsp. olive oil
- 4 tbsp. soy or tamari sauce
- 2 tsp. sesame oil
- 1 tbsp. rice vinegar
- 1 tbsp. grated ginger
- 2 tbsp. spring onion, chopped
- handful coriander, to serve

Nutrition per serving: 494 kcal 16g Fats 56g Carbs 42g Protein

**HEALTHY LIVING** 

### Directions:

- **1**. Cook the noodles according to the instructions on the packaging. Strain and rinse with cold water, then set aside.
- 2. In a wok or deep pan, heat the olive oil and fry the turkey for about 3-4 minutes. Add in the broccoli florets and fry for another 1-2 minutes. Next, pour half a cup of water and 3 tbsp. of soy sauce, then cook until all the water evaporates and the broccoli is tender (about 10 minutes).
- **3.** In the meantime, mix together the remaining soy sauce, sesame oil, vinegar, grated ginger, and mix well.
- **4.** Once turkey and broccoli are ready, add in the cooked noodles and heat it for 2-3 minutes. Take off the heat, pour in the sauce and gently mix.
- 5. Serve with chopped spring onions and coriander leaves. A

# HORMONES Often the Culprit for Symptoms AFTER BRAIN INJURY



#### BY DEBORAH ZELINSKY, O.D. EXECUTIVE RESEARCH DIRECTOR, THE MIND-EYE INSTITUTE

n the words of journalist and author Susannah Cahalan, "Hormones get no respect," but anyone who has sustained a head injury or concussion is likely to agree with biochemist Barry Sears, Ph.D., that those disrespected chemicals "control your life."

In fact, traumatic brain injury (TBI) can throw hormones out of balance, causing a cascade of symptoms ranging from cognition difficulties, poor memory, and confusion; to psychiatric and psychosocial disorders — mood swings, anxiety, stress, depression, changes in personality; to actual physical conditions, like diabetes, obesity, nausea, dehydration, sleep problems, hyponatremia (low sodium), and adrenal insufficiency.

### Statistics indicate about 1.5 million Americans are diagnosed with a TBI annually.

Scientists from the Uniformed Services University of the Health Sciences investigated the effects of mild blast injury on the neuroendocrine stress response. Their 2017 article suggested TBI disrupts the hypothalamus-pituitaryadrenal (HPA) axis, thereby altering stress hormones and increasing risk for anxiety and other neuropsychiatric disorders. The hypothalamus, a structure located near the middle of the brain, regulates basic functions such as the body's stress response, cardiorespiratory function, circadian rhythm, body temperature, appetite, and thirst, "telling" the pituitary gland when to release hormones. The hypothalamus also plays a role in the control of behavior and emotions.

Authors of a study published in a 2019 issue of the International Journal of Molecular Sciences report more than 25 percent of brain-injured patients develop some form of post-traumatic hypopituitarism — a deficiency in the pituitary gland's production of one or more hormones, with the most affected being growth hormone. If the hypothalamus is not functioning efficiently, the pituitary will not necessarily receive appropriate signals and will not release the hormones the body needs. For instance, lack of sufficient growth hormone can lead to anxiousness, anxiety, worry, and low self-esteem, as well as fatigue, headaches, and changes in adult body fat and muscle. The presence of chronic hypopituitarism "impairs [a patient's] recovery and rehabilitation," the researchers say.

Hormones also shift posture, according to researchers from Uppsala University in Sweden. Writing for an August 2021 edition of eLife, the authors indicate a TBI prompts the body to release hormones that result in movement deficits or disorders on both sides of the body.

### So, you might ask why an optometrist is discussing endocrinology issues?

... because the retina is composed of brain tissue, serving as an interface between internal functions and the external world. More than a million signals leave the retina after the transformation of external light into electrical signals. Those signals travel along communication pathways further in the brain, and one of those retinal pathways is routed directly to the hypothalamus (the retino-hypothalamic tract). Selective stimulation of the retina apparently influences activity in the hypothalamus.

Using eyeglasses to selectively stimulate retinal signals can change the body's movement, posture, adrenaline production, sleep, and other physiological processes. When light is dispersed on certain portions of the retina, posture reflexes are triggered to shift posture or move in a certain way beneath the level of consciousness.

Any discussion of hormonal imbalances and their impact on posture must include eye position, which optometrists measure during examinations. Unlike persons who are calm and whose eyes readily move around, patients with an overabundance of stress hormones are put into constant fight-flight-or-freeze mode, with increased tension in muscles that control eye movement, thereby limiting overall eye movement. When eye position is too limited, peripheral eyesight fails to function effectively, and such failure can disrupt visual processing, skewing how a person responds to motion, sounds, and light.

Indeed, the majority of signals from the environment come via the peripheral receptors in the retina. Peripheral eyesight governs a person's judgment of the speed, size, location, and shape of objects and provides the information needed to strategize and act. In combination with central eyesight, peripheral sight enables the shifting of gaze quickly and accurately. When eye movement is restricted, incoming information is limited, and responses are often neither relaxed nor effortless.

#### "{P]atients with an overabundance of stress hormones are put into constant fight-flight-or-freeze mode, with increased tension in muscles that control eye movement, thereby limiting overall eye movement."

Should the neurological, chemical, and muscular changes set in motion by a TBI become chronic, the hypersensitized patient with impaired peripheral eyesight may develop post-traumatic stress disorder — or PTSD. PTSD decreases awareness of, and attention to, one's surroundings, often resulting in spatial dysfunction and disorientation. Those changes in perception can, in turn, cause mood dysregulation and difficulty in thinking logically.

All of this might cause one to ask if victims of TBI can ever find relief and a return to near normalcy even after years of struggling with symptoms, including the hormonal dysfunction of a damaged or disrupted brain.

Fortunately, scientific advances have given today's optometrists the tools necessary to prescribe therapeutic eyeglasses designed for peripheral retinal processing. These are not intended to bring the clarity of a person's central eyesight to 20/20. Rather, they selectively stimulate retinal communication pathways in the brain by changing the amount, intensity and angle of light that disperses across portions of the retina. The ultimate goal is to rebuild the patient's visual processing skills by either restoring informational roadways in the brain damaged by TBI or constructing new ones that circumvent injured or disrupted areas.

Frequently, people are told no eye or brain damage has occurred as a result of their head trauma. Yet, their symptoms linger, because the head injury has pushed various systems of the body out of synchronization. Each system functions well on its own, but they are not working together in a unified fashion. Restoration of some visual processing skills can be achieved through normalization of peripheral eyesight and re-integration of sensory systems, thus helping bring other basic physiological and biochemical functions – like hormone production – back into balance.

"Frequently, people are told no eye or brain damage has occurred as a result of their head trauma. Yet, their symptoms linger, because the head injury has pushed various systems of the body out of synchronization."

Individualized glasses are certainly not magic, but they are often a wonderful adjunct to collaborative TBI protocols. The bottom line: if you believe out-of-whack hormones to be the cause of your persistent moodiness, just know you might be able to use a pair of therapeutic eyeglasses to change them.

**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 21stcentury research into optometry, thus bridging the gap between neuroscience and eye care. www.mindeye.com/tbiquiz

"[S]cientific advances have given today's optometrists the tools necessary to prescribe therapeutic eyeglasses designed for peripheral retinal processing."



# **THE ZAC EASTER STORY** A Writer's Exploration of a Damaged Mind

#### **PODCAST HIGHLIGHT**



#### **BY IAN HEBEISEN**

urrently working for the Star Tribune newspaper in Minnesota, Reid Forgrave's writing career has covered sporting events including college tournaments, NFL games, and the Summer Olympics. He writes in a long-form narrative style, making his articles engaging and engrossing. Out of all the writing he's published, Forgrave's book *Love, Zac: Small-Town Football* and the Life and Death of an American Boy might be his most important piece.

The book recounts the life of Zac Easter, a high school student suffering from CTE (chronic traumatic encephalopathy, a condition occurring in people suffering from multiple blows to the head), as well as depression and alcohol abuse. Zac played high school football and sustained multiple hard hits, leading to severe head trauma.

As his mental health declined, Zac began recording his symptoms and experiences in journals. He died from suicide at the age of 24, leaving behind his journals for others to study in an attempt to help people struggling through similar situations.



Forgrave first heard of Zac from his obituary, and was struck by the final paragraph saying, "His last wish was to make sure that no one else has to struggle from head trauma like he did. It is important to Zac to tell his story about CTE, a disease he attempted to manage for years ... He's unselfishly donating his brain along with a detailed diary, the document of his life so that no one suffers the way that he did."

"Any obituary of a 24-year-old man is obviously heartbreaking, but Zac's was just even more so," said Forgrave. "This obituary just absolutely hit me in the gut."

Moved by the touching words of Zac's family, Forgrave decided to reach out to Zac's parents. Two weeks later, Forgrave found himself sitting in the Easter living room with Zac's parents and girlfriend.

The family passed along the journals, and Forgrave read them. Evidently, Zac suffered from severe migraines, slurred speech, blurred vision, brain tremors, dementia, and other physical ailments in addition to his CTE.

During Zac's senior year, he sustained three concussions in the span of two months. After the first two concussions, doctors cleared him and gave him the "go-ahead" to continue playing.

#### "Zac suffered from severe migraines, slurred speech, blurred vision, brain tremors, dementia, and other physical ailments in addition to his CTE."

"It's like, these things are supposed to happen — those big hits," said Forgrave. "So much of this comes down to the culture and the bigger discussion on how we look at violence in sports, especially with our kids."

Following Zac's third concussion, Sue Wilson, a trainer at Zac's high school, pulled Zac from the game. Wilson was one of the first to take concussions seriously and now serves on the governor's task force for traumatic brain injuries in the state of Iowa. Had Wilson not acted proactively, Zac's mental health might have deteriorated much faster.

The Easter family was no stranger to sports-induced brain injuries. Zac's older brother sustained numerous

concussions during his athletic career as well. "His older brother had some concussions but did not suffer the same level of trauma that Zac did," said Forgrave.

#### "Let's recognize how important concussions are — I think it's way better to call them TBIs. If you call it a traumatic brain injury, then you're not going to say someone just got dinged up."

As Forgrave's exploration of the journals continued, his view on the story behind them shifted. "You can look at it as a cautionary tale about football and concussions, but it's not evil," said Forgrave. "Let's recognize how important concussions are — I think it's way better to call them TBIs. If you call it a traumatic brain injury, then you're not going to say someone just got dinged up."

Zac's journals and Forgrave's investigation into them has helped shed light on the nature of TBIs and sports-induced concussions. "The scariest part isn't these big hits, because you can more or less legislate those out of the game," said Forgrave. "It's those repetitive hits — linemen are hitting heads virtually every play, and that stuff builds up."

The book *Love, Zac* was published in 2020, but the first article Forgrave wrote on Zac was included in the Best American Sports Writings of 2018. To honor Zac's memory, his family formed the organization CTE Hope, a foundation designed to carry out Zac's final wishes.

"The scariest part isn't these big hits, because you can more or less legislate those out of the game," said Forgrave. "It's those repetitive hits — linemen are hitting heads virtually every play, and that stuff builds up."

"I think we should recognize that we should have hope. CTE isn't a death sentence," said Forgrave. "Science moves slowly, but we can do what we can as a culture to take this seriously."

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.

You can listen to this episode of Faces of TBI on iTunes or wherever you listen to podcasts.



### DIRECTORY

#### **CBD PRODUCTS**

Entangled Biome www.entangledbiome.com

#### **ESSENTIAL OILS**

Young Living Essential Oils http://bit.ly/YLamyz

#### FUNCTIONAL NEUROLOGY

Integrated Brain Centers www.integratedbraincenters.com

#### **NEURO TECH**

Rezzimax Tuner Pro www.rezzimax.com

#### PERSONAL INJURY ATTORNEYS

Heuer Fischer, P.A. www.heuerfischer.com

Nurenberg Paris Injury Lawyers www.nphm.com/about-us/ attorneys/jeff-heller/

#### PODCAST

Faces of TBI www.facesoftbi.com/ podcast-series

#### COMMUNITY OUTREACH

Arizona Brain Injury Alliance www.biaaz.org

CTE Hope www.ctehope.com

LoveYourBrain www.loveyourbrain.com

The Brain Injury Association of America 800-444-6443 www.biausa.org

The Brain Injury Helpline 800-263-5404 www.obia.ca

The US Brain Injury Alliance www.usbia.org



# Have You Suffered a Concussion? We treat concussion patients from across the country!

Finding solutions for concussions can be confusing, frustrating and overwhelming. At Integrated Brain Centers we specialize in Functional Medicine and Chiropractic Neurology. We utilize the most cutting edge brain based rehabilitation therapies, which improves the overall health and function of your brain without the use of pharmaceutical drugs or surgery.







Dr. Shane Steadman

Dr. Perry Maynard

For concussion help contact us at **303.781.0126** www.integratedbraincenters.com