How to Treat Cognitive Impairment Due to Traumatic Brain Injury

By Richard M. Carlton, M.D.

Traumatic Brain Injury (TBI) is a preventable and treatable condition that, if left unchecked, can predispose a person to cognitive impairment/dementia. This article describes the following:

MECHANISMS: Why and how TBI can favor the development of dementia

INTEGRATIVE TREATMENT: Holistic approaches you can incorporate in your life to treat TBI if it has already occurred. In my direct clinical experience, these approaches can minimize the impact that these conditions will have on cognition, and moreover, they can even reverse some of the functional losses that may have already taken place.

PREVENTION: Steps you can take to prevent TBI from occurring in the first place.

Mechanisms by Which Dementia Develops in TBI

When the skull is hit hard (referred to as blunt force trauma, e.g. from a fall, or from a blow to the head): For a fraction of a second, millions of miniscule bubbles will form in the solid matter of the brain, and will then quickly dissipate. But like Sherman marching through Atlanta, a swath of destruction is left in the wake of this swarm of nanobubbles. Specifically, the bubbles trigger the release of glutamate, a “normal” neurotransmitter that, when released in excessive amounts, acts like shrapnel on...
During this coronavirus epidemic, you may wonder why we are featuring traumatic brain injury (TBI) when people are spending a lot of time at home. According to the Report to Congress on Traumatic Brain Injury in 1999, TBI causes the largest number of deaths and disabilities in children and young adults due to car accidents and sports injuries, followed closely by people over age 75 who have a high risk due primarily to falls, the majority of which occur at home.

But it’s not just a question of numbers. Regardless of the cause of the injury, those who suffer from TBI often have a long road to recovery, and many of them experience short- and long-term cognitive deficits. Due to the very nature of “accidents,” most can be prevented.

Awareness of one’s surroundings, not rushing from place to place, and getting enough sleep, all help to prevent mishaps. At a time when many of us are forced to slow down, let’s think about keeping ourselves safe when our regular activities resume.

Being mindful in our daily lives is the first step to preventing accidents, and you will be given some helpful tips to do just that in our lead article.

We are fortunate that Richard Carlton, MD, an integrative psychiatrist with over 40 years of knowledge and experience, has written about TBI and how to prevent it. Dr. Carlton is on the Sharp Again Naturally Medical and Dental Advisory Board and was an early proponent of using supplements whenever possible to improve cognitive health. Our Q & A this month is on concussion, written by Madeleine Castellanos, MD, a functional medicine doctor and psychiatrist who is trained in Dr. Dale Bredesen’s protocol for reversal of cognitive decline.

Our understanding about the brain has expanded in recent years, and although this amazing organ is more resilient than doctors once believed, we also see how devastating head trauma can be. Football players who suffer from repeated hits to the head, develop Chronic Traumatic Encephalopathy (CTE) and Alzheimer’s Disease in disproportionate numbers. Young athletes are also experiencing symptoms of head trauma.

Our brains are precious, and they need and deserve care to remain in good working order. In future issues of The Sharper Edge, we will address other forms of physical and emotional trauma and their effects on brain health.

We hope you and your families stay safe and well. Please reach out if we can be of support during this challenging time.

Lisa Feiner
Board Chair, Sharp Again Naturally
MECHANISMS . . . continued from page 1

nearby neurons (a process called “neurotoxicity”).

Whatever the mechanism by which the physical trauma works, there are downstream consequences that manifest themselves in what we call “pathologies,” typically a disruption of anatomical structures, or a disruption of function, or both. Some of these pathologies are of academic interest only, due to the fact that they don’t (yet) translate into something we can easily address and remedy. However, there are other pathologies that do offer hints, to the inquiring mind, of steps we can take to improve the outcome. We call this “translational medicine.”

One of the important pathologies of TBI, and also of Alzheimer’s disease (AD) as well, is that large numbers of neurons can no longer get glucose to enter the cell. So they are starved for “fuel,” that fuel being glucose. It’s not that there’s a shortage of glucose, or a shortage of insulin. These are in abundance. Rather, the trauma to the brain has disrupted the insulin receptors on the neurons, so that these receptors can no longer activate a portal (think of it as a turnstile) that is needed to transport glucose into the cell. It’s like someone plugging up your car’s gas tank with rags — the fuel can’t get in.

With little or no glucose getting in, these neurons falter. The clinical result is slow thinking, difficulty taking initiative, problems following through, dysregulation of affect, and the like. In other words, all the major aspects of executive function have taken a hit.

KETONES

It is important to note that in Alzheimer’s Disease there is a very similar disruption of the insulin receptors on neurons. And this is why both conditions — TBI and AD — respond so well to foods and “medical foods” that provide ketones, such as coconut oil.

Ketones are the final breakdown product of fat metabolism. When you ingest coconut oil, the liver converts it into “ketone bodies” that passively diffuse into the neurons (no receptor needed, no turnstile involved). These ketones thereby provide an “alternative fuel” for the brain.

The brain is thus a hybrid engine. If it cannot get glucose, it can utilize ketones. This is important for species survival in the face of famine: We will break fat down into ketones that will keep us alive in the face of starvation. I and many other

continued on page 4 . . .
of my functional/integrative colleagues have seen coconut oil produce huge gains in people with dementia, TBI, and/or Parkinson’s disease (yes there are problems with neuronal insulin receptors in Parkinson patients).

Some skeptical physicians are critical of all the hype around coconut oil. They don’t understand the metabolic strategy underlying this approach, and therefore, in their minds, “it can’t work”. It can, and it does. Numerous scholarly articles have been published on the subject, and one of the most compelling facts is that, gram for gram (actually mole per mole), each molecule of ketone produces vastly more energy (as a high-energy molecule called ATP) than does each molecule of glucose.

There are some side effects of coconut oil that we need to be aware of. Specifically, it can cause loosening of stools and even frank diarrhea. So start with a low dose of coconut oil, e.g. ¼ teaspoon once per day, and build slowly, perhaps to one full tablespoon twice a day.

If you are administering coconut oil or other ketone strategies to someone who is profoundly demented, watch out: they can suddenly become much more active, and can then injure themselves because they don’t yet have full awareness. I have seen this in my own practice. It’s like the movie “Awakenings.” You may have to “baby-proof” the house to prevent injuries.

OTHER TREATMENTS
It is intriguing that many of the medications and nutraceuticals that help patients who have dementia are also helpful for patients who have TBI. An excellent compilation of sound ideas for treating TBI can be found in Textbook of Traumatic Brain Injury, edited by Jonathan Silver et al.

PRESCRIPTION MEDICATIONS: In that book there is a useful chapter called “Psycho-pharmacology”. Some of the medications they list as being useful for the cognitive impairments seen in TBI include stimulants (methylphenidate and dextroamphetamine), amantadine, bromocriptine, Sinemet (levodopa/carbidopa), modafanil, and donepezil. These may be worth trying, particularly if the nutraceuticals in the next section do not work sufficiently well.

NUTRACEUTICALS: Another very helpful chapter in Dr. Silver’s textbook is the one entitled “Alternative Treatments”, by Drs. Richard Brown and Patricia Gerbarg. On page 683 of the 2005 edition of the book, the authors provide a table listing a number of nutraceuticals. We will list them here, without commentary as it goes beyond the scope of this article. It is very worthwhile to know about these, that they are available and that they work. You can then consult that chapter, and/or do a literature search, to delve more deeply. In the list below, the items that I have put in bold are ones that I universally recommend to patients with TBI and/or dementia. The others in the list are probably very good, but I have had little or no experience with them.

Galantamine Pyritinol
Huperzine Idebenone
Centrophenoxine Vinpocetine
Acetyl-L-carnitine Rhodiola roseae
Citicholine Ginkgo biloba
Ginseng L Deprenyl
Picamilon B vitamins
S-adenosylmethionine (SAMe)
Racetams (e.g. piracetam)

NEUROFEEDBACK (“NF”): NF is a type of biofeedback where the “signal” you are trying to train is the amount of abnormal neuronal activity in various regions of the brain. Some regions are underactive, as will be seen visually on a computer-based analysis of brain activity that is called a quantitative EEG (qEEG). These underactive regions can be “tuned up” through biofeedback. For example, when the underactive region in question happens to show more activity, you are “rewarded” by being able to continue to watch a video that you have been set up to watch. The video will stop running if you slip out of that zone of activity. The cumulative effect of this training (over many sessions) is a meaningful improvement in executive function. I don’t do NF in my own practice, but I do work very closely with a colleague who has helped scores of TBI patients. If you are interested, contact me at rcarltonmd@gmail.com, with the word NEUROFEEDBACK in all caps in the Subject heading, and I’ll get you a link to a directory or some contacts in your part of the world.

YOGA: This can help in several ways. One is that you need to come into your body, to allow breathing to take place and find a way to “live” with the disability you’ve suffered. Another benefit is that yoga teaches us to be less judgmental, meaning more accepting of the limitations from which you are suffering. We all have a tendency (that we have to overrule) to be critical of what is “wrong.” People with TBI can wind up hating their brains, and hating themselves, and this sends them into a vicious downward spiral.

Important to know: “Accepting” does not mean that it’s OK with you if this loss from which you are suffering goes on forever. Rather, it means that it is here now; you cannot make it go away; and if you are confrontational with it (if your own dialog inside your head is nasty), you are punishing yourself. You don’t scowl at your dog when it limps from arthritis, do you? No, you love it and extend your empathy.

Learn to accept and to let go, and you may heal. This does not mean that you stop looking for help. It means that you stop hating yourself, along the way.

The February/March 2020 issue of Brain & Life ("Neurology for Everyday Living"), published by the American Academy of Neurology, has a wonderful article entitled “How Yoga Can Help People with Traumatic Brain Injury.” The author recommends a TBI-specific yoga program you can get online, at loveyourbrain.com/yoga. If you try it, please let me know at the above email address if you find it helpful.

Dr. Richard Carlton is an integrative psychiatrist and pioneer in the rational use of nutrition-based treatment approaches when treating “mental” issues (such as depression, anxiety, ADHD), or “physical” problems (such as cognitive impairment or dementia, migraines, PMS, and IBS). He practices in Port Washington, NY.
Many of the ideas about prevention presented here may seem obvious, and you have probably heard many of them already. But if even one or two of these ideas stick, so that you remember them while engaging in an activity in which you are vulnerable, then your quality of life will be protected and it will have been worthwhile to consider once again these sensible ideas.

**FASTEN YOUR SEAT BELT.** Don’t drive even “just one block” without putting your belt on. Most auto accidents occur within a mile or so of the home. You don’t have to go through the window to suffer a devastating TBI. Just a solid tap of your head against the glass, at a decent speed, can severely affect your life.

**LOOK UP!** Overhanging objects: Make a mental note that they are there. If you are about to bend down under an open cupboard door, or underneath a stairwell, remind yourself of the danger before you do it. Otherwise, when you absent-mindedly stand back up you will get a whack.

**DON’T PUT OBJECTS DOWN IN THE PATH WHERE YOU OR OTHERS WILL BE WALKING.** Instead, put things down along the wall, or in a corner. A neighbor of mine was hospitalized for a fall after she put her shoes down in the middle of the hallway, turned around to get something, and then walked forward and tripped on one of the shoes.

**“WATCH WHERE YOU’RE GOING.”** There’s a less judgmental variant that I prefer: “Go where you’re watching.” If you can’t see the path clearly, don’t go. It could be that the path (e.g. through a room) is dark. It could be that you’re carrying objects that partially obscure your field of vision. It could be that you’re looking at your cell phone or tablet as you walk. Murphy’s Law tells us that if there is an object along that path, and if you don’t see it, your foot will somehow manage to find it. Whether the ensuing fall smashes your head, or fractures your hip, is just a matter of chance — a chance you don’t want to take.

**LOOK DOWN!** Consistent with “Go where you’re watching,” be mindful and observant for (a) cracks in the sidewalk (see the Case History below), (b) sidewalks pushed up by the roots of a tree, (c) rough patches of macadam, and of course (d) icy patches (especially on grates and on those metal gates one opens to gain entrance to store basements).

**NEVER WALK WITH YOUR HANDS IN YOUR POCKETS.** A friend of mine tripped on a rough patch of macadam and couldn’t get her arms out in time to break the fall. She hit her sternum on the curb and was in excruciating pain for a month.

**BALANCE TRAINING** Take classes that improve your balance. This could be yoga, Tai Chi, balance classes at the Y or the health club or at your local medical center. These classes can prevent falls, and can teach you skills to land more safely if you do fall.
At intake, “Nancy” (not her real name) was a 73 year-old bipolar woman with a Ph.D. in Psychology. Prior to her TBI, she had been a high-functioning scholar, author, and international speaker. The TBI had occurred two years earlier when she tripped on an uneven sidewalk and landed flat on her face. There was no loss of consciousness. She was treated at a nearby urgent-care center, with a gash at the left temple and a black eye. In the days that followed the injury she became dizzy, and had trouble walking straight. Each step she took seemed to “rattle” her brain. Ever since, she has shown many of the signs and symptoms of TBI: she becomes exhausted easily; has profoundly lost her ability to focus on tasks; has great difficulty taking initiative; and feels depressed and demoralized. She now has tremendous difficulty completing the writing tasks she has undertaken, and teaching and supervising postdoctoral candidates. At intake she was getting neurofeedback training, with some improvements, but the NF practitioner referred her to me for metabolic/nutritional support.

I started this bright and engaging lady on Rhodiola, DopaMind (an herbal product that increases synthesis of dopamine and is neuroprotective), bacopa, gingko, and saffron extract (which can help treat depression). All of these improved her cognition and mood to some extent, but she still had difficulty completing articles she had to write and felt tortured by this disorganization. So, we added in the prescription drug amantadine, which counteracts excess glutamate toxicity while increasing dopamine and acetylcholine. The drug significantly improved executive functioning and increased self-esteem; unfortunately, it had to be discontinued because (even at fractional doses) it provoked double vision, a fairly common side-effect. Stimulant medications that normally help people with TBI were contraindicated for Nancy who is bipolar. In her case, even the nutraceutical SAMe (see above), which we had tried early-on, induced hypomanic mood and had to be discontinued. We are still looking at prescription meds and nutraceuticals.

At two points in the course of treatment she had to stop all of the nutrients completely, to avoid the potential side effect of bleeding after dermatological surgery. Both times, within days of stopping the nutraceuticals, her executive functioning plummeted back towards baseline, and her depression worsened profoundly. On both occasions when she resumed the nutraceuticals, her cognitive gains returned and the depression was greatly reduced.

This was not a controlled study, as there was never any time on placebo. But it is crystal clear to her from the “crossovers” (when she came on and off the nutraceuticals), that she is enjoying robust improvements from the nutraceuticals. Further improvement is needed with executive functioning, but the gains in cognition and mood are huge and unmistakable to her.
Q&A: CONCUSSIONS

By Madeleine Castellanos, M.D.

CONCUSSIONS are serious head injuries that often go unreported or undiagnosed but have significant cognitive and overall health consequences for individuals. Here Dr. Castellanos answers some questions related to concussion identification and treatment.

Q: What exactly is a concussion, and can I have one without realizing it?

A: A concussion is type of traumatic brain injury (TBI) caused by a quick movement of the head, often-times hitting another object. This rapid movement causes the brain to collide against the inside of the skull enough to produce a type of bruising or inflammation. It could be from a direct hit such as in football or a blow to the head. But even a small fender-bender that results in whiplash or a fall can result in a mild-to-moderate concussion. They are much more common than you think and often go unrecognized.

Q: What symptoms should I look out for to see if I have a concussion?

A: Even though a loss of consciousness is a good indicator of concussion, there are many other milder symptoms which should be cause for concern as indicators of a concussion. Most people are familiar with the physical symptoms of a concussion — headache, sensitivity to light or noise, blurry vision, balance problems, nausea, or fatigue. But there may also be cognitive issues such as difficulty concentrating, easily fatigued by reading or using a technological device, difficulty remember new information, or not being able to process things as quickly. There can be disturbances in sleep such as an increased need for sleep, or restless sleep and/or difficulty falling asleep. Finally, mood issues can also be a symptom of concussion including anxiety, agitation, irritation, sadness, and even quickly moving from one emotion to another. Symptoms vary from person to person depending on the area of the brain affected, as well as the with the severity of the concussion.

Q: Who is at risk for a concussion?

A: Those individuals who participate in contact sports such as football, soccer, lacrosse, and hockey are at high risk for concussion, and athletes may have multiple concussions over the years. Skiers and even those riding bikes are at risk, regardless of age. Protective equipment does not necessarily help since the injury is caused by the brain hitting the inside of the skull, not a direct hit to the outside of the skull itself.
elderly are particularly at risk for concussions for two reasons: First, as brain size decreases with age, there is more space between the brain and the skull. With this increased distance, any concussion would be more pronounced. Also, elderly persons are at higher risk for falls, which could include a head injury and/or whiplash culminating in a concussion. A very common cause of concussion that often goes unnoticed is a car accident of seemingly mild impact that can produce enough force to bruise the brain against the skull and cause a concussion. If treatment for a concussion does not continue until there is complete recovery, then that person is also at risk for re-injury.

Q If I don’t get treatment for it, will my body heal itself after a concussion?

A Although the body is designed to heal itself, the central nervous system cannot resolve inflammation as easily as the rest of the body. Once there is inflammation in the brain, it tends to simmer for quite some time, delaying the healing process. The inflammation and symptoms of concussion can continue after the initial injury for months or even years without proper treatment.

Q Are there long-term consequences to my health if I get a concussion?

A About 20% or more of patients who experience a concussion go on to develop chronic issues as a result of head trauma, called post-concussion syndrome, in which symptoms persist for longer than 6 weeks. In some cases, symptoms can persist for years. The more concussions a person has, the greater the chance of developing post-concussion syndrome, and the damage can accumulate with repeated injury. This long-lasting inflammation can result in greater activation of the stress response cycle, and impairment of gastric motility and immune barrier of the intestines and the brain. It may even result in emotional dysregulation or in debilitating sensory disturbances such as inability to tolerate loud places or busy patterns. Some patients may also develop learning difficulties, personality changes, and other cognitive deficits. Any number of neurological symptoms may become permanent as well including loss of taste or smell, ringing in the ears, motion sickness, or mood disorders.

Q What type of doctor should I see if I think I may have had a concussion?

A There are neurologists who specialize in head trauma, TBI and concussion. If you suspect that you have had a concussion, or have a history of contact sports, falls, motor vehicle accidents, or other activities that jar the head and you have any symptoms — even mild changes in ability to concentrate, mood changes, or a decreased ability to tolerate sounds, busy environments, or bright lights — you should be evaluated by a concussion specialist. If you are experiencing significant symptoms impairing your ability to work, study, or interact with other people, you should seek out a specialty clinic that includes a multidisciplinary team of neurologists, neuropsychologists, physical therapists, occupational therapists, and speech pathologists.

Q What are some current treatments for concussion?

A The treatment for a concussion will depend on the severity of symptoms a person is experiencing. Initially, a person will require more rest and will not be able to take on the same workload that they did before the... continued on page 10...
concern. Rest includes additional sleep as well as limiting screen time including phones, computers, and television exposure. Once it’s been determined that there is no structural damage such as bleeding, rest needs to be paired with gentle activity to encourage good blood flow to the brain and stimulation of different brain areas to support healing. Gentle exercise that does not risk re-injury such as walking or rhythmic movements can be very helpful. Stationary bicycle and swimming can also be excellent forms of gentle exercise which increase blood flow and coordination. Treatments must be tailored to the symptoms a person is experiencing. Examples of treatments include balance therapy, vision therapy and neuro-optometric rehabilitation, occupational therapy, physical therapy, and cognitive behavioral therapy to name a few. The goal is to avoid medications whenever possible since the system is more sensitive to these after a concussion. In the case of severe concussion or TBI, it may be necessary to use anti-seizure medications for a short period of time.

Q: Are there nutritional or therapeutic treatments for concussion?

A: There are several natural treatments for concussion that assist with decreasing inflammation in the central nervous system, thereby allowing healing to proceed faster. These include high doses of good quality fish oils to help improve blood flow to the brain as well as provide the building blocks for healing cells of the central nervous system. Micronized progesterone (bio-identical), and small doses of lithium orotate can help decrease the exaggerated inflammatory response in the brain. N-acetyl cysteine may also be helpful for many people to decrease overstimulation of the brain. Overall, a person’s nutrient status should be optimal, especially for levels of magnesium, zinc, copper, B vitamins, vitamin D3, and antioxidants. Hyperbaric oxygen treatments can be very helpful for the treatment of concussion and TBI because it supports the energy centers of the cell, which accelerates healing. Acupuncture has also been shown to be helpful for mobilizing energy to accelerate healing of concussion and decrease pain.

Concussions are often overlooked or their impact minimized, which can discourage a person from seeking treatment or continuing treatment until they have completely healed. Treatment for concussion should begin early, be tailored to a person’s symptoms, and be continued far beyond the acute stage of injury. Recognition and early action are paramount in helping to restore an individual’s health and level of functioning.

Madeleine Castellanos, MD is a functional medicine physician with a specialty in psychiatry, practicing for over 20 years in New York City and South Florida. She is trained in the Bredesen Protocol to reverse cognitive decline and uses a systems-based approach to help patients reduce inflammation, improve metabolism, reduce physical and mood symptoms, and improve overall health.
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INFO@SHARPAGAIN.ORG
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