

Concussion Repair Manual: A Guide to Traumatic Brain Injury

Analysis by [Dr. Joseph Mercola](#)

✓ Fact Checked

June 10, 2023

STORY AT-A-GLANCE

- › An estimated 80% to 90% of people have had some form of traumatic brain injury (TBI). Military personnel, football players, soccer players and boxers tend to be at particularly high risk, but TBI can happen to anyone, for a range of reasons
- › An estimated 4 million to 6 million people are on disability due to chronic severe conditions resulting from their TBI, but many more have undocumented TBIs, be it from a car accident, slip and fall incident or simply hitting your head on a cabinet
- › Telltale signs of TBI include poor concentration, mood changes, irritability, changes in your ability to focus and follow through on mental tasks, poor word recall, foggy thinking and sleep problems
- › Long-term, chronic traumatic encephalopathy – low-grade accumulation of concussions over time – accelerates the process of dementia, raising your risk for neurological dysfunction and disease later in life
- › Treatment aids include floatation therapy, hyperbaric oxygen therapy, photobiomodulation, pulsed electromagnetic field therapy, transcranial direct current stimulation, neurofeedback and CBD oil

Editor's Note: This article is a reprint. It was originally published March 18, 2018.

Dr. Dan Engle, board-certified in adult psychology and neurology, and who completed psychiatric fellowships in child, adolescent and forensic psychiatry, has written an

indispensable guide to recovering from traumatic brain injury (TBI), "[The Concussion Repair Manual: A Practical Guide to Recovering From Traumatic Brain Injuries](#)."

TBI is incredibly pervasive. An estimated 80% to 90% of people have had some form of TBI. Military personnel and athletes such as football players and boxers tend to be at particularly high risk, but TBI can happen to anyone, for a range of reasons. Engle has had personal experience with it, which is what motivated him to pursue this discipline of medicine and write a book about it.

"I went to college to play soccer ... Boxers ... who get slugged in the face – that's about 20 pounds of pressure to their brain. Soccer players, if you go in for a full volley or a full header, take 70 pounds of pressure to the brain ... I had a series of concussions that led up to me choosing medical school," he says.

"Two weeks before medical school, I broke my neck. That was a big entry point in a recalibration of my direction ... I started [medical school] in a Halo Device, where they screw it into your skull and you're walking around fixated.

For the first three months of med school, I was in this Halo. It was the first thing that finally slowed me down. It helped me self-reflect. It helped me realize that I was driving at a level of intensity in my life that I didn't really enjoy.

I ended up having much more fun in med school and residency than I did in high school and college, just because I wasn't so intense with everything. It oriented me from ER and surgical medicine into neurology and psychiatry.

[My focus] was ... the neuroreparative aspects of brain injury and spinal cord injury, as well as the more humanistic side of understanding people, the stories of what make us who we are and the mindset of healing, and how very [important] that is to recovery."

TBIs Are Pervasive, yet Many Don't Get Proper Rehabilitation

A common myth is that unless you've suffered complete loss of consciousness, you didn't have a concussion or significant head injury, but this simply isn't true, Engle says. Generally speaking, a concussion is a mild TBI, and will score higher on assessment using the Glasgow Coma Scale (a scoring system that grades your level of consciousness after a TBI). More severe TBIs that are moderate or severe will respectively score lower.

An estimated 4 million to 6 million people are on disability due to chronic severe conditions resulting from their TBI, but many more have undocumented TBIs — be it from a car accident, slip and fall incident or simply hitting your head on a cabinet. Most of these injuries are mild and heal on their own, but even mild TBI can have lingering effects that can become chronic unless you address them.

"Most people, if they just hit their head on the door or cabinet, it's not going to be enough to have a significant neurological sequela moving forward, but sometimes, it will. Oftentimes, the thing that happens in the home that will have negative long-term impacts is a fall.

If you slip on a rug or slip going down the stairs, there's a significant momentum that jostles the brain inside the skull to what's called a coup contrecoup injury, or back-and-forth kind of injury. That's going to be noticeable," he says.

Telltale Signs of TBI

Oftentimes the injury doesn't seem severe enough to have caused TBI, which is why telltale signs are often overlooked — things like poor concentration, mood changes or changes in your ability to focus and follow through on mental tasks. Word recall may also suffer. Emotional dysregulation, irritability, foggy thinking and sleep problems are also common effects.

Whenever you experience an injury to your head, regardless of how severe it appears to be, pay careful attention to any psychological changes that might occur over the coming week or two. Signs such as those just mentioned are indications that your nervous

system is on high alert due to an inflammatory cascade, which presents itself as psychological and cognitive downstream effects.

"The old adage, 'Go home and rest. It'll be OK,' has some merit," Engle says. "But when I had my concussions – the last of which was after I broke my neck ... – I knew something was off because I had problems with attention, focus, concentration, memory, sleep, kind of like the classic post-concussive syndrome ...

This was 20 years ago. We didn't really have appreciable technologies and therapeutics to heal it. I put myself in the lab. It was not fine for me that things were going to continue to be subpar. I wanted to try everything out ... The things that worked for me or had worked significantly for friends, family and clients are the things that I ended up putting in the manual ...

Some people will experience hypersomnolence, particularly in the acute concussion phase, because the system needs to go into a quiet mode, convalesce and rest ... So, get into a low stimulation environment. Being away from electronic stimulation, stressful work, stressful engagements at home; being able to really bring the energy home or rest the nervous system [is important]."

TBI Assessment

There are now novel and portable infrared imaging techniques that can help assess TBI damage, such as whether there's active or acute bleeding inside the skull. In professional football, they now have neurodiagnostics and a neurologic exam that will allow the doctor to assess whether the player is fit to return to the field.

"We've seen variable efficacy of that in the National Football League just this last year. Those protocols are getting more specific and refined all the time.

But suffice it to say, it's important, as soon as somebody has a significant injury, to be able to get evaluated, whether it's by a professional on the sideline, in the

emergency department or somebody who's trained in concussion care management, to assess what their level of safety is, and what their level of potential risk should they have another impact," Engle says.

Adults injured at home will be able to self-reflect and notice psychological and neurological changes, but what about children? It's important for parents to know how to assess their child's neurological state, and be observant enough to notice changes in behavior. "Because kids are rambunctious ... if there is a significant injury and there's a change in function within the next few days to few weeks, then that means further workup and more assessment is needed," Engle says.

If your child plays soccer or football, Engle recommends having a "really clear conversation with the coach about what their stylistic tackling profiles look like. Are they asking them to lead with their head? Is there a clear discussion about the importance of brain health and the necessity for recuperation after a concussion? Do the players themselves know what the long-term potential downstream effects are? All of those things."

Long-Term Effects of Accumulative TBIs

Long-term, chronic traumatic encephalopathy – low-grade accumulation of concussions over time – accelerates the process of dementia, raising your risk for neurological dysfunction and disease later in life. Many football players and boxers start showing these signs in their 30s and 40s. If you are genetically predisposed to Alzheimer's by having one or two ApoE4 alleles and suffer a TBI, your risk of Alzheimer's increases at least tenfold.

"And, if you look at dietary issues and chronic inflammatory issues, for example [eating a] high-sugar diet, not fasting and these sorts of things, and then you stack on lifestyle mismanagement or not being optimized for brain performance, then you're going to accelerate that process even further," Engle warns.

Engle discusses a number of prevention strategies in his book, including nutritional components that optimize brain function and help repair neurological function in case of injury. Among the most important are the animal-based omega-3 fats docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA).

According to Engle, the department of surgery at Oregon Health and Science University now even advocates use of omega-3 supplements presurgery, because outcomes are better. Another potent anti-inflammatory is curcumin. Both of these are also valuable for the prevention of dementia.

The Benefits of Floatation Therapy

Engle is a strong proponent of floatation therapy, noting "floatation therapy is on the front line of many different recovery and regenerative medicine protocols, because it has the opportunity to reset so many different systems."

"When somebody drops into a float tank experience or a sensory deprivation experience, it's essentially the first time since they were conceived that they're without environmental stimuli ... [Y]ou're floating in about a foot of water. [The tank] is about the size of a king-size bed. There's about 1,000 to 1,200 pounds of Epsom salts [in it]. It's very buoyant, kind of like the Dead Sea. There's no gravity; there's no appropriate [sensory] reception.

There's no skin temperature differentiation, because the water is the same temperature as the skin, not core temperature. It's hard to tell where you end and the rest of the universe begins. There's no sight and there's no sound. Everything is offline, so to speak. Eighty percent of what the brain is consistently bringing in is environmental stimuli. Now, there's more energy toward the recuperative mechanisms.

It's both a brain technology and a consciousness technology, because ... [the] floatation tank [experience] is like meditation on steroids. If somebody's using [for] recuperative and regenerative [purposes], they may well find more peace in

their lives outside of the tank as well ... because it starts to reset the neuroendocrine system.

Cortisol levels normalize. Global inflammatory markers normalize. Blood pressure normalizes. The relationship between the brain and the endocrine or the hormonal systems starts to optimize ..."

Engle recommends doing a series of eight to 10 floating sessions within a three to four-week period. By the end of that series, you should notice significant improvement in your symptoms. You may also find yourself more at ease in general, sensing a better "flow" in your life. For maintenance, do one or two sessions per month.

Other Treatment Aids

Other helpful interventions include:

Hyperbaric oxygen — By saturating your tissues with oxygen, the oxygen is able to get into all of the neuroreparative mechanisms in your entire neurologic system from head to toe. It accelerates all wound repair processes, be it in peripheral vasculature or in central vasculature, around the nervous system, brain and spinal cord.

An alternative for home use would be Exercising with Oxygen Therapy (EWOT). It's not as effective as hyperbaric oxygen treatment for neurological recovery because you're not saturating the tissues with oxygen, just your blood, but you can still benefit if you have a low partial pressure of oxygen (low oxygen in your blood).

Low-light laser therapy (LLLT), also known as photobiomodulation, which can be done using either lasers or light-emitting diodes (LEDs).

"There are a lot of different studies that show light is beneficial," Engle says. "When we're talking about neurologic recovery or building adenosine triphosphate (ATP) production, driving mitochondrial function, there are certain wavelengths that seem to be optimal for that."

Most of the wavelengths for neurologic recovery are going to be in the near-infrared (810 to 830 nanometers) and far-infrared spectrum. There are some handheld devices that can be used." Red light in the 660 nanometer frequency is also beneficial, and many technologies will combine red with near- and far-infrared.

Pulsed electromagnetic field therapy (PEMF) – Engle explains, "If we're optimizing voltage and frequency into the cell, then there are going to be energy thresholds below which disease happens, and above which optimized function happens. PEMF tends to raise the voltage and the energy in the cell, in the system globally, to improve physiologic function ...

I use a combination of both low-voltage systems and high-voltage systems. There's a low-voltage system called a Bio Electromagnetic Energy Regulation (BEMER). There's a high-voltage system called the Pulse. I found benefits in both ... There's also a subset of pulsed frequencies called transcranial magnetic stimulation, which is more based in magnetic impulse to the brain."

Transcranial direct current stimulation (TDCS) – TDCS provides a more global stimulation, so while some patients experience good results, others do not, due to lack of specificity. According to Engle, if it's going to work, you'll notice results quickly. If no benefit is noticed in the first few sessions, move on to some other therapy.

Electroencephalography (EEG) and neurofeedback are similar technologies of varying complexity.

"You go in to master your ability in real time to see where your brainwave patterns are firing, and then to lock into the necessary thought modalities and internal states to be able to consistently access an alpha state," Engle explains. Alpha states are indicative of calmness and centeredness.

"If I can access that and find that place within myself, then I'm starting to generate my own sense of personal empowerment." The Evoke system is an easy one to use. It

involves watching a movie for 20 to 30 minutes. Your focused attention will keep the movie playing. When your attention drifts, it slows down and loses volume.

Cannabidiol (CBD) oil – "CBD is up there with fish oil for neuroreparative support," Engle says. "Cannabis has two primary therapeutic components; one is tetrahydrocannabidiol (THC) and one is CBD. THC has a psychoactive component. CBD has a neuro-reparative component.

There seems to be an upregulation effect or an enhanced effect if there's a little bit of THC with CBD. The CBD to THC ratio will be like 20-to-1. We've consistently seen benefit in the neurologic system, whether it was stroke recovery, concussion recovery or seizure and epilepsy support ... There seems to be this neurologic repair effect.

The CBD receptors are globally affiliated with neurologic function throughout the entire brain. When we're engaging and stimulating those receptors, we see the neurochemical cascade toward repair, regardless of the input, but particularly with concussion.

That's why during the acute phase, if somebody has an injury that is significant, I say, first and foremost, do [these] things: 1) Lifestyle management. Get quiet. Float if you can. 2) Take fish oil, take CBD, vitamin D and melatonin, particularly if there are issues with sleep. Boost the antioxidants." CBD may actually be a really potent stimulator of nuclear factor-like 2 (Nrf2) pathway, which stimulates the hermetic production of antioxidants in your body.

More Information

If you have TBI or you know someone who does, be sure to pick up a copy of "[The Concussion Repair Manual](#)." You'll need it. There are far more details in the book than we have time or space to discuss in this interview. It's an amazing resource. Engle spent the last 20 years doing the research for you, so you now have it all in one convenient place.

In addition, if you've had a concussion or TBI, Engle has put together a free Concussion Repair Checklist to help you recover. It covers exactly what you need to know, along with the Top 10 foods for supporting your brain health. You can download it free of charge at ConcussionRepairChecklist.com.

"I wanted to write it as a fairly available user's manual for the person going through the experience," he says.

"There are a lot of different methodologies, a buffet of options. The encouragement is to get clear on what tools are available tools in your immediate environment that you can try, and then stay consistent with that methodology while tracking your symptom over a 30-day period. If there was improvement, great, then continue.

If there was improvement but you think there could be more improvement, then you may need to up the intensity or the frequency. We didn't even talk about [ketogenic diet](#). It might be going even more keto, going even lower carb, or doing that in a more intense way, stacked with flotation and low-level laser therapy. Find a hyperbaric oxygen tank and do that regularly.

Pick the top two or three methods that you want to try. Stay with that over a period of time, be diligent, get support and make sure you're tracking your top symptoms from the concussion or the neurologic injury – sleep, irritability, focus, concentration and so on. I put a part in the book as a workbook to make it easy to track [symptoms] on a daily basis.

Even more important than that, I think, is staying diligent and knowing deeply that everything is possible to heal. The brain is super plastic. We know that being consistently engaged in optimized modes of thinking, optimized modes of inspiration and empowerment, affect people's healing. It's as much of a mindset as it is a neuroanatomy and a neurochemical thing."