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Even Mild Head Injuries Increase Risk for Parkinson's Disease

Analysis by Dr. Joseph Mercola Fact Checked | June 08, 2023

STORY AT-A-GLANCE

- The accumulation of mild head trauma over time has been shown to raise your risk for neurological dysfunction later in life. This includes not only Alzheimer's but also another neurodegenerative process, Parkinson's disease
- According to recent research, even a single concussion could increase your risk for Parkinson's by 56% to 83%, depending on the severity of the injury
- Those with one or more TBIs in their past also received a diagnosis of Parkinson's on average two years earlier compared to those who had never had a TBI
- 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
- Commonsense strategies that will lower your risk of suffering a TBI are discussed, as are helpful treatment aids that will facilitate brain healing

Editor's Note: This article is a reprint. It was originally published May 3, 2018.

According to some estimates, as many as 90% of the population have experienced some form of traumatic brain injury (TBI), be it from a car accident, slip and fall incident or simply hitting your head on a cabinet. Unfortunately, most go undiagnosed and untreated, and the accumulation of low-grade concussions over time has been shown to

raise your risk for neurological dysfunction later in life. This includes not only Alzheimer's but also Parkinson's disease.[1,2]

Parkinson's disease is a neurodegenerative disorder in which neurons in dopamine-producing cells within a region of your brain known as the substantia nigra, which is required for normal movement, begin to weaken and die.

Symptoms, which typically progress over time, include tremors, slow movement, rigid limbs, stooped posture, an inability to move, reduced facial expressions and a shuffling gait. The condition can also cause depression, dementia, speech impairments, personality changes and sexual difficulties.

Concussion Linked to Increased Risk of Parkinson's Disease

According to research published in the journal Neurology,[3] even a single concussion could increase your risk for this degenerative brain disease. Here, "concussion" was defined as loss of consciousness for up to 30 minutes or alteration of consciousness and/or amnesia for up to 24 hours.

Medical records of nearly 326,000 U.S. military veterans ranging in age from 31 to 65 were evaluated in this retrospective cohort study, showing that a TBI resulting in loss of consciousness raised the risk of Parkinson's by 56%.

Veterans who experienced more serious TBIs (classified as moderate-to-severe) were 83% more likely to develop Parkinson's. Overall, all-severity TBI (i.e., TBIs of any severity classification) was associated with a 71% increased risk. Those with one or more TBIs in their past also received a diagnosis of Parkinson's on average two years earlier compared to those who had never had a TBI.

Lead author Dr. Raquel Gardner,[4] staff neurologist at the San Francisco Veterans Affairs (VA) Medical Center and assistant professor in the department of neurology at the University of California, San Francisco (UCSF) told Reuters:[5]

"This is not the first study to show that even mild traumatic brain injury increases the risk for Parkinson's disease.[6] But we were able to study every single veteran across the U.S. who had been diagnosed at a Veterans Affairs hospital, so this is the highest level of evidence we have so far that this association is real …

While on an individual level the actual amount of risk is pretty low, on a population level this could translate into a lot of people being affected [with Parkinson's]."

Implications for General Population

Coauthor Dr. Kristine Yaffe, professor of psychiatry, neurology and epidemiology at UCSF and the VA, added that these findings have "important implications for the general population" as most of the TBIs veterans suffered actually occurred during their civilian life, not during active service. As of yet, the exact mechanism behind the TBI-Parkinson's link is unknown. According to Gardner:[7,8]

"We don't have brain autopsies, so we don't know what the underlying biology is. But in Parkinson's you see abnormal protein accumulation, and there's some evidence that TBI is linked to deposits of these abnormal proteins … The TBI might directly trigger changes in the brain that weren't there before.

The other possibility is that maybe there was a process already happening in the brain and the person might have gotten Parkinson's disease [anyway] many years later. But the brain injury made the symptoms come on sooner and the diagnosis come sooner. We need more studies to unravel the biology behind what's going on here."

That said, the authors stressed that TBI in no way assured the development of Parkinson's. Ninety-nine percent of veterans with TBIs did not develop Parkinson's, so individual risk is still very low, even with a TBI. The disease is also strongly dependent

on lifestyle factors such as diet and exercise. As noted by Gardner, "If anyone is worried, do a little bit better to live more healthily."[9]

Telltale Signs of TBI

Oftentimes the head injury doesn't seem severe enough to have caused TBI, which is why symptoms are often overlooked. Common telltale signs of head trauma — which need to be addressed — include:

- Poor concentration and foggy thinking
- Impaired word recall
- Mood changes, irritability and emotional dysregulation
- Lowered ability to focus and follow through on mental tasks
- Sleep problems or hypersomnolence

Whenever you experience an injury to your head, regardless of how severe it appears to be, it's important to pay careful attention to any psychological changes that might occur over the coming week or two. Signs such as those mentioned above are indications that your nervous system is on high alert due to an inflammatory cascade, which presents itself as psychological and cognitive downstream effects.

Adults injured at home will be able to self-reflect and notice psychological and neurological changes. Children on the other hand may not be able to do this, and need to be carefully monitored by their parents for changes in behavior and function. If you notice a change in your child within the days or weeks following a head injury, a more comprehensive medical evaluation and workup is strongly recommended to avoid long-term repercussions.

How to Prevent TBIs

There are a number of commonsense strategies that will help prevent the occurrence of a TBI in the first place. This includes the following:[10]

- Always wear your seat belt when driving or riding in a car, and never drive while under the influence of alcohol or drugs. This includes many prescription drugs that may alter your ability to drive safely, such as opioid pain killers, which are now responsible for more fatal car crashes than drunken driving.

  Also make sure your child is properly buckled into a child safety seat while driving. Infants should be kept in a rear-facing seat that has been properly secured in the back seat, not the front passenger seat. Children aged 2 to 5 should be in a forward-facing seat in the back seat until they exceed the height or weight limit for the seat.

  Ages 5 to 9 should ride in a front-facing booster seat in the back seat. Never drive with a child aged 12 or under in the front passenger seat, as deployment of the air bag may cause severe injury or death to undersized passengers.

- Wear a helmet when:
  - Riding a bicycle, motorcycle or any other motorized vehicle, including off-roading with an all-terrain vehicle
  - Playing contact sports
  - Skating or skateboarding
  - Playing baseball or softball
  - Horseback riding
  - Skiing or snowboarding
- Safeguard the elderly in your home by:
  - Removing tripping hazards such as throw rugs and clutter
  - Using nonslip mats in bathtub and shower

    - Installing grab bars next to your toilet, tub and shower, and handrails along both sides of stairways
    - Improving lighting
    - Maintaining a regular physical activity program to maintain or improve strength and balance
- Safeguard children in your home by:
    - Installing window guards
    - Using safety gates at top and bottom of stairs
    - Using nonskid bathmats and nonslip mats in tub and shower
    - Never leave your child unattended in a highchair
- Make sure your child's playground has shock-absorbing material such as hardwood mulch or sand in key areas where falls are likely to occur

Long-Term Effects of Accumulative TBIs

Long-term, chronic traumatic encephalopathy, i.e., the accumulation of low-grade concussions over time, accelerates the process of dementia. 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.

Stacked with an inflammatory diet and other lifestyle factors such as lack of exercise and not fasting (which promotes neuroregeneration), the process of neurological degeneration is further exacerbated and accelerated.

In his book, "The Concussion Repair Manual," Dr. Dan Engle, provides comprehensive guidance on how to recover from TBIs. I recently interviewed him about this, and if you missed it, you may want to review it now. Engle discusses a variety of healing strategies in his book, including nutritional components that optimize brain function and help

repair neurological function in case of injury. I'll review some of these at the end of this article.

The Importance of Omega-3 Fats

Among the most important nutrients for brain health are the animal-based omega-3 fats docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA). The department of surgery at Oregon Health & Science University now advocates use of omega-3 supplements presurgery, because outcomes are so much better. Animal-based omega-3 has also been shown to protect your brain against damage associated with dementia.

Omega 3 fats affect cellular health and DNA chiefly by how they influence your cell membranes. It is these cell membranes that are critical in switching your genes on and off, because cell membranes contain receptors that respond to hormones and other agents, and these are affected by the fatty acids on their surface.

Your cell membranes contain EPA, DHA and phospholipids, and all help to shuttle molecules into and out of your cells. So, having adequate fatty acids in your system is crucial to keeping your cell membranes working properly.

DHA is especially important, as it is a structural component of every cell in your body that helps regulate communication within the cell and between cells, and has a profound influence on mitochondrial health. It's particularly crucial for your brain, as more than 90% of the omega-3 fat found in brain tissue is DHA.

There are actually specific transporters for DHA in your blood-brain barrier that shuttle these molecules in a very precise way into the cell membranes where they belong.

The Omega-3 Index Test Is an Important Health Screen

I believe the omega-3 index test can be an enormously important health screen — regardless of whether you've already had a TBI or not, as optimizing your omega-3 level can help cushion the effects of a future head injury. As with vitamin D, getting your level

tested is really the best way to customize your dosage to ensure sufficiency, because requirements for omega-3 will vary depending on your lifestyle.

Your intake of fatty fish, for example, and your level of physical activity will play a role. Athletes tend to burn off their omega-3 quite rapidly, as the DHA gets burned as fuel rather than being used as a structural component of their cell membranes. Hence they will need higher dosages.

Seafood is your best source of DHA and EPA. However, it's important to realize that not all fish contain these fats. Tilapia, for example, contains neither. The fish needs to be harvested from cold water, as this is where the fish richest in omega-3 fats are found. Some of your best options for clean fats are **wild-caught Alaskan salmon**, **sardines** and **anchovies**.

An excellent alternative, if you do not want to eat fatty fish, is to take a krill oil supplement. I firmly believe krill oil is superior to fish oil. Although both contain EPA and DHA, krill oil is bound to phospholipids that allow these omega-3 fats to travel more efficiently through your bloodstream. Hence, it's more bioavailable.

TBI Treatment Aids

Other helpful interventions for TBIs, which are discussed at depth in Engle's book, include the following:

Curcumin — Curcumin, one of the most well studied bioactive ingredients in turmeric, has been shown to have over 160 potentially therapeutic activities. Many of curcumin's benefits are attributed to its ability to quench inflammation, which is a hallmark of most chronic diseases. Importantly, it has the ability to cross your blood-brain barrier and exhibits potent neuroprotective properties, suggesting it may be useful for neurodegenerative disorders.

Researchers at the University of California recently demonstrated it may have long-term effects on your cognitive function by protecting against brain inflammation.[11]

Curcumin has also been shown to enhance neurogenesis and improve cognition by increasing levels of brain-derived neurotrophic factor (BDNF).[12] Reduced levels of BDNF have in fact been linked to Alzheimer's disease, and correlate with the level of motor impairment in patients with Parkinson's.[13]

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. 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 into 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.

Sources and References

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