
Concussions

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Ottawa Holistic Wellness

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INTRODUCTION

Concussions are a traumatic brain injury with often temporary effects. However, these effects can be long-lasting and can lead to post concussion syndrome.

Post concussion syndrome can be persistent and debilitating, restricting everyday life and impacting longterm quality of life.

A few symptoms of concussions include:

- headaches and dizziness
- nausea and vomiting
- problems with concentration
- memory issues
- difficulty with balance and coordination

Gain relief now and live your life to the full!



CHAPTER 1

WHAT IS A CONCUSSION?

Post Concussion Syndrome - Symptoms, Diagnosis And Treatment



A Concussion is a common occurrence in daily life in Canada.

There is a strong association between concussions and Canadians favourite sports especially ice hockey, Canadian football, rugby and soccer.

The majority of people who suffer a concussion do not experience any lasting health consequences. However, for some people, the effects can be

debilitating and long-lasting known as post concussion syndrome.

In this article, we will discuss the pathophysiology, symptoms and signs, and treatment options for a concussion and post concussion syndrome.

What Is A Concussion?

A concussion is defined as a complex pathophysiological process affecting the brain, induced by biomechanical forces.

In laymen's terms, this means that an impact to the skull causes chemical changes that affect how the mind works.

Head injuries cause a disruption in the movement of ions in and out of nerve endings. This disruption is known as an Ionic Shift. When an ionic shift occurs, the brain uses a large amount of energy in the form of glucose to correct this shift. If change continues over a long period the demand for energy outweighs the supply leading to an Energy Crisis.

At the same time as the ionic shift, a reduction in the blood flow to the brain occurs further reducing the supply of energy/glucose.

A brain injury affects the visual and vestibular systems and cognitive or thinking processes.

How Do Concussions Affect the Visual System?

The brain dedicates about 70% of its energy to processing signals from the eyes. This strong connection between the brain and eyes mean that a concussion will significantly affect the visual system.

Common ways in which a concussion affects the visual system include difficulties tracking and focusing on objects. According to research, up to 90% of concussions can cause at least one visual disturbance.

How Does a Concussion Affect the Vestibular system?

Along with cognitive and other sensory processes the vestibular system uses the remaining 30% of the brains sensory processing. The vestibular system is also densely connected with the visual system. As such the vestibular system is highly susceptible to injury following a traumatic brain injury. For example, for people with concussion dizziness is the second most common symptom.

How Does a Concussion Affect Cognition?

According to research an energy crisis during the acute stages of concussion can lead to cognitive difficulties such as:

- Attention
- Reaction time
- Information processing
- Working memory

What are the symptoms of Concussion?

The common symptoms of concussion include:

- Headaches
- Dizziness
- Light and sound sensitivity
- Nausea and vomiting
- Balance problems
- Fatigue / Sleepiness
- Sleep issues
- Difficulty concentrating
- Fogginess
- Memory issues
- Anxiety and Depression

It is important to realize that symptoms may be immediate, but are often delayed. Loss of consciousness occurs in less than 10% of cases and is not a marker of severity. Similarly, the degree of force of impact is always consistent with symptom severity.

How To Treat Concussion

When treating a concussion, it is essential to recognize and address the injury as early as possible. If a person experiences a head injury, even if they do not appear to have symptoms, it is essential to seek out an objective clinical evaluation. Diagnosis of concussion should not be made on symptoms alone.

How Most Medical Doctors Treat Concussion

Most medical doctors traditionally prescribe rest for a concussion. This rest includes avoidance of time watching TV, playing video games, reading, and texting. All these restrictions are related to the eyes or visual system and do not address the vestibular and cognitive processes.

Complete rest of the visual system is critical within the first 24 to 48 hours following the injury because the eyes are a significant drain on energy. After that time it is vital to address the other systems.

Clinical Recovery Vs Physiological Recovery

The majority of well-managed concussion cases will exhibit clinical recovery in a relatively quick timeframe. Clinical improvement is defined as a remission of symptoms. For adults, clinical recovery is usually within two weeks while children and adolescents are generally within 30 days.

There is some evidence however that complete physiological from concussion recovery may take longer than clinical improvement. Physiological recovery is defined as the normalization of objective medical testing.

Physiological Susceptibility

A concussion renders the brain more susceptible to cellular injury. If additional trauma is sustained before physiological recovery more severe brain damage may result in an increase in symptoms, a more prolonged recovery timeframe, and Second Impact Syndrome.

Second Impact Syndrome

Second Impact Syndrome (SIS) happens when a second trauma occurs when the brain is still in a state of energy crisis.

SIS results in severe neurological impairment and brain swelling which may lead to coma and death.

SIS is a rare but devastating consequence of a premature return to sport.

Post Concussion Syndrome

Post concussion syndrome occurs when symptoms exceed expected the anticipated timeframe for recovery. According to research, 15 to 20 % of individuals with a concussion continue to experience persistent and potentially debilitating problems months after injury.

Unfortunately, the current Canadian healthcare system is not currently for this patient population.

What Causes Post Concussion Syndrome?

The causes of Post Concussion Syndrome are not well understood, and they are thought to be a combination of neuropathological and psychological factors. Researchers have identified some risk factors for persistent symptoms from concussion including:

- A high initial symptom load
- History of a migraine
- History of vestibular or visual symptoms
- History of anxiety or depression
- History of insomnia
- Teenage females tend to at a higher risk for a protracted recovery

Symptoms Of PCS

Symptoms of PCS may include:

- Visual and balance problems
- Dizziness
- Neck pain
- Anxiety and depression
- Headaches and migraines
- Insomnia

The symptoms of PCS are not specific to a concussion and share clinical features of other conditions such as PTSD, depression, chronic pain and insomnia. As such, PCS requires an interdisciplinary approach to treatment.

Conclusion

Concussion results in an energy crisis that is typically resolvable, but should be appropriately managed.

During the acute stage of concussion, the brain is highly susceptible to further injury so underscoring the importance of a delayed return to sport.

It is critical to managing the injury early and effectively, particularly in those at higher risk of symptoms.

The treatment of Post Concussion Syndrome relies upon the identification of triggers and managing them accordingly.



About the Author

Dominick Hussey, Functional Medicine and Osteopathic Manual Practitioner, combines osteopathy, functional medicine with nutrition and lifestyle counselling in his practice, and strongly believes that healing is a process in which the patient must take an active role.

He has become disillusioned with modern approaches which simply provide a band-aid approach to mask and temporarily relieve symptoms. His passion is in determining the real, underlying cause for those symptoms and in so doing to bring about true, deep, lasting healing.

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CHAPTER 2

IS REST THE BEST THING FOR CONCUSSION?

Rest has been the mainstay of concussion management for years.

Doctors base this approach to the treatment of concussion on three central ideas.

Firstly, that the energy crisis caused by a concussion renders the brain vulnerable to physical and physiological stress.



Secondly, rest keeps the patient more comfortable and less at risk of exacerbating symptoms.

Thirdly, studies have shown that patients engaged in higher levels of cognitive and physical activity post-concussion have taken longer to recover.

However, is rest the right approach for managing a concussion?

What is the evidence?

Research does not support the strategy of complete rest following a concussion.

In 2002, researchers found that there was no difference in outcomes with bed rest versus no bed rest in the week after a concussion.

In 2013 a study concluded that the recommendation for cognitive rest had no significant association with recovery time.

In 2016, researchers found that two days of complete cognitive and physical rest did not improve recovery times.

Does Rest Lengthen Recovery Times?

In 2015, researchers carried out a randomized control trial to look at the effect on recovery times of 5 days of strict rest compared to 5 days of usual care. Usual care consisted of 1-2 days of rest followed by a gradual return to activities. Results showed that the participants in the strict rest group had increased symptom reporting and slower resolution of symptoms.

What are the risks of rest?

Health professionals traditionally interpret rest as lying in a dark room, limiting noise, no school, no work, no use of electronics, no reading or cognitive exertion of any kind.

However, what happens when symptoms persist despite rest. There is no evidence that continued rest improves outcomes persistent cases.

Furthermore, continued rest is not without risks including reinforcement of symptoms such as depression, withdrawal, social isolation, generalized anxiety, physical deconditioning, insomnia, and missed academic/work time.

What about Physical Activity?

In a 2016 study, researchers investigated the association between physical activity within seven days post-concussion and the incidence of symptoms. The researchers found that 69.5% of participants who participated in light aerobic exercise within seven days of injury had a lower risk of persistent symptoms.

Another recent 2018 study looked at the time of initiation of aerobic exercise and whether it influenced recovery time. The researchers found that early participation in the aerobic exercise was associated with faster recovery and the longer that exercise was delayed, the longer the recovery time.

The study supports the early (within one week) start of sub-symptom threshold aerobic exercise.

In 2017, researchers published a consensus guideline on concussion regarding the rest as a means to alleviate symptoms and promote recovery.

“There is currently insufficient evidence that prescribing complete rest achieves these objectives. After a brief period of rest during the acute stage (24-48 hours) after injury, patients can be encouraged to become gradually and progressively more active while staying below their cognitive and physical symptom-exacerbation thresholds.”

What Can We Take Away?

Research shows that intense cognitive/physical activity in the acute stage of concussion may be harmful. Furthermore, strict rest has also been shown to be ineffective and potentially dangerous!

Current consensus guidelines recommend 1-2 days of complete rest followed by a gradual return to activity. However, these guidelines still leave us with the question of what rest involves and which activity should be introduced and when.

Such a cookie cutter approach is unlikely to work.



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CHAPTER 3

THE AUTONOMIC NERVOUS SYSTEM: THE MISSING PIECE?

There are many articles, a wealth of information and numerous opinions available on the topic of Concussion Treatment.

Most treatment revolves around the physical aspect of the trauma. Whilst this is essential there are other aspects that should be considered.

The Autonomic Nervous System



Concussion and Traumatic Brain Injuries result in a complex process that has a systemic effect on the body. In particular, there is an impact on the Autonomic Nervous System (ANS). The ANS controls the automatic, unconscious processes in our body such as heart and respiration rate, blood pressure and digestion. It also controls our being in a state of relaxation or of fight / flight.

Dysregulation of the ANS has been shown to trigger an inflammatory response, arrhythmias (irregular heart beat / palpitations), depressed immune system, irritable bowel syndrome, depression, anxiety, as well as being a factor in psychiatric disorders.

It may also contribute to generalized anxiety disorder, post-traumatic stress disorder, panic disorders or a tendency to be over-reactive to external or internal stressors.

More information on Autonomic Dysfunction after Mild Traumatic Brain Injury can be found in this article:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5575620/>

Concussion Treatment: The Missing Piece?

Dysfunction in the Autonomic Nervous system impacts so many aspects of our health. Providing treatments and strategies to address this is essential for complete healing to occur. The ANS needs to be calmed and brought back into a state of homeostasis in order for all other systems of the body to function normally.

What can be done?

There are many ways to address the dysfunction. Every person is an individual and may need one or more approaches.

Sleep

Probably the most important! Making sure to rest when needed, to go to bed at a reasonable time and to sleep as long as your body needs. Try to make your bedroom dark, quiet and not too warm. Remove all electronics from the room and stop using them at least 2hrs prior to going to bed.

In addition, allowing space and giving yourself permission to nap whenever required can be extremely beneficial.

Mindfulness And Meditation

Working to calm the mind, to bring focus and to take time to consciously slow the breathing affects the body in a profound way. It can bring the ANS into a state of rest and digest. Breathing techniques can be used at any time throughout the day to bring a sense of calm.



Yoga

If done correctly yoga is an exercise in breathing, mindfulness, and a form of meditation as well a physical practice. Choose a teacher who is sympathetic to your limitations and always work within your own comfort level. It is not a competition, there will always be someone in the class who is more flexible or more agile than you.

Energy Healing

There are many Energy Healing modalities such as Reiki, Pranic Healing and Chakra Balancing. They all work with the energy in your body and bring a deep sense of relaxation. They can also work on a deeper level to release the shock and trauma of your injury from the subconscious and your body.

Massage And Reflexology

Although massage is usually thought of as a physical treatment for the soft tissues of the body, it can be highly affective for calming the nervous system.

Reflexology also brings deep relaxation.



These modalities will provide a complement to the more conventional treatment protocol of:

- Rest
- Exercise - Increase blood flow to the brain and improve mental health / mood
- Manual Therapy – Massage, Chiropractic, Osteopathy, Physiotherapy
- Diet and Nutrition - reduce inflammation and feed the body and brain
- Vision and Vestibular rehabilitation
- Professional emotional support, Counselling and Talk Therapies

More info on standard treatment approaches can be found on these websites:

<http://www.braininjuries.org/>

<https://completeconcussions.com/2016/06/29/top-5-evidence-based-treatment-concussion/>

And in this article about rehabilitation for concussion:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4387881/>

Conclusion

Anyone suffering from concussion or traumatic brain injury may benefit from the addition of modalities to calm the ANS and bring about a state of homeostasis. In particular, where a more convention treatment protocol is not bringing results and healing, this may be the missing piece so give it a try!



About the Author

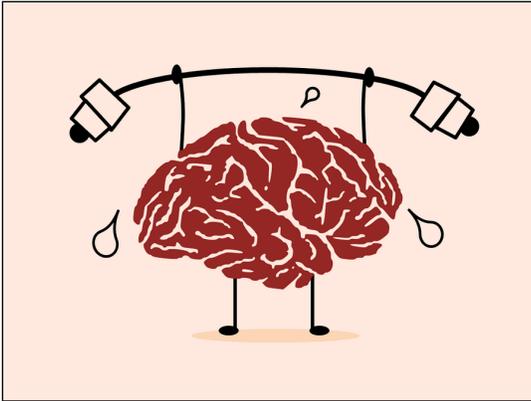
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CHAPTER 4

COMBATting CONCUSSIONS: CAN DIET AND LIFESTYLE HELP WITH RECOVERY?



A history of concussions (mild traumatic brain injury) has been associated with increased risks of anxiety, depression, epilepsy, headaches, nausea, dizziness, poor memory, and concentration difficulties.

What are some relevant dietary and lifestyle strategies you can implement to combat concussions?

Diet

Dietary adjustments, when combating the symptoms of concussions, focus on an anti-inflammatory approach. Antioxidants should be consumed liberally from wild fish, leafy green vegetables, berries, and green tea; healthy fats from coconut oil, flaxseed, olive oil, nuts and seeds.

Ketogenic Diet

Brain injury alters the way the brain uses glucose for fuel. Instead of producing energy from sugars, the brain begins to increase the production of insulin and lactic acid.

Fasting to combat hyperglycemia has been shown to protect brain tissues.

Ketone bodies are produced from fat for use as an alternative energy source in a fasting state. Ketones have been shown to improve the brain's metabolism, increase energy production, and reduce oxidative damage. A ketogenic diet requires a higher consumption of fats relative to carbohydrates. Ketogenic dietary ratios of fats to carbs can be 1:1, 2:1, 3:1, or

4:1. Both brain injury and epileptic patients benefit from the neuroprotection and anti-inflammatory action of ketogenic diets.

Healthy fats when incorporating a ketogenic approach include: Olive, Avocado, Coconut, Grapeseed, Almond, Walnut, Macadamia, Grass fed butter

Carnitine and selenium deficiencies have been noted as an outcome of the ketogenic diet long-term, so it is important to be under the guidance of a skilled healthcare practitioner. Carnitine allows the mitochondria of cells to utilize fats for energy more efficiently. Selenium is needed for proper thyroid and cardiac muscle function.

Melatonin

Melatonin may be reduced in patients with post-concussional syndrome, and can help with oxidative damage and inflammation. Certain anti-anxiety and antidepressant medications may deplete melatonin secretion over time. In addition, sleep issues associated with an altered circadian rhythm have been documented in patients with brain injuries. Melatonin can help to normalize circadian rhythm (sleep-wake cycle), reduce insomnia, and offer neuroprotection. Melatonin can also offer anti-anxiety and anticonvulsant properties. Furthermore, melatonin has been shown to alleviate the immunodeficiency associated with brain injury.

Creatine

Creatine plays a large role as a fast-energy reserve in both brain and skeletal muscle; however, it is also found in the CNS, crosses the Blood-Brain Barrier (BBB), and contributes to proper nerve structure and function, membrane potential, calcium homeostasis, and neurotransmission. Brain creatine levels are associated with aspects of memory and cognitive function.

Omega-3 Fatty Acids (DHA)

DHA strengthens synapses in the brain and enhances learning and memory. It is abundant in wild salmon & other fatty fish oil, walnuts, flaxseed, and fruits & vegetables. In a 2016 study, Yang et al. reported that hundreds of brain genes can be damaged by fructose. Researchers noted that DHA seems to reverse the harmful changes produced by high fructose consumption and hyperglycemia. Omega-3 fatty acid intake is also associated with improved symptoms of mood disorders (depression, anxiety).

Magnesium

Magnesium levels are reduced by brain injury, and supplementation improves neuronal behaviour and function. Magnesium is also beneficial for migraine and tension-type headaches, as well as anxiety.

Curcumin

Curcumin has been found to be effective in reversing neuronal dysfunction in neurodegenerative disease (a possible consequence of repetitive brain trauma). Curcumin can enter the brain's blood supply and has a strong antioxidant effect, which may help reduce lipid peroxidation and protect against learning impairments. Additionally, recent animal research has shown curcumin to improve brain injury outcomes by restoring energy metabolism in the brain and reducing inflammation.

N-acetylcysteine (NAC)

NAC was formulated in hospital emergency departments to combat acute acetaminophen poisoning. It can rapidly increase levels of glutathione, a chief antioxidant found in the liver and lungs, as well as in every cell in your body. This nutrient works best within 24 hours of initial injury to help with dizziness, hearing loss, headache, memory loss, sleep disturbance and cognitive dysfunction.

Resveratrol

A component of grape seed extract, resveratrol is a potent antioxidant. Pre-clinical research demonstrates improved motor performance, visual-spatial memory, and behaviour after a concussion. More research is needed to determine the clinical effects, and establish a dosing protocol. Adding red grapes (with seeds), dark chocolate, and blueberries to your diet will help with intake of resveratrol.

Branched-Chain Amino Acids (BCAAs)

Leucine, Isoleucine, and Valine are the BCAAs. Supplementation of BCAAs in animals with traumatic brain injuries helped to combat the inability to stay awake often seen in concussion patients.

As always, consult with a trained medical professional before starting any new supplement or diet.

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