

SPORTS-RELATED BRAIN INJURY AND AUTONOMIC NERVOUS SYSTEM

January 1, 2016 Dr. Patrick Nemechek

Sport-related traumatic brain injuries (concussions) are a major health problem, affecting millions of athletes each year. While the clinical effects of brain injuries (e.g., symptoms and functional impairments) typically resolve within several days to weeks, increasing evidence suggests that persistent neurophysiological abnormalities continue beyond the point of clinical recovery after an injury.

The key to resolving the lingering brain damage lies within the autonomic nervous system (ANS), the portion of the brain that coordinates organ function, immune system activation and hormone regulation. Thanks to technological advancements I am able to pinpoint damage, and apply my autonomic recovery protocol for athletes to achieve key recovery months or even decades after a sports-related brain injury.

A brain injury may occur from a variety of causes. There are brain injuries from typical physical impacts to the head known as a minor traumatic brain injury (mTBI) or a "concussion".

There are also sub-concussive brain injuries (SCBI) which refers to the cumulative neurological damage caused by repetitive but mild trauma to the head that might be experienced by a baseball catcher or a soccer player. Minor yet cumulative brain injuries (CBI) can be just as harmful as an mTBI or a concussion.

Non-traumatic brain injuries (NTBI) can also mimic the effects of a TBI in an athlete, and they can result from events such as intensely negative emotional events (i.e., broken heart syndrome), infections, vegetable oil toxicity in the diet, exaggerated responses to vaccination, and cancer treatment. NTBIs can be just as harmful as an mTBI or a concussion.

Athletes who suffer from the effects from a sub-concussive brain injury or from a non-traumatic brain injury can be puzzled because they do not remember, or they did not have, the typical physical impact or type of event that they think they must experience in order to sustain a brain injury.

These problems are not unique to athletes. Most individuals within the general population are experiencing non-traumatic brain injuries over the course of their lifetime.

The first step in reversing the damage is to identify and understand the mechanism that is being damaged in these types of brain injuries. Studies are beginning to show that changes in blood flow to the brain play a major role in the symptoms commonly experienced after a brain injury. The autonomic nervous system is the main control mechanism for blood pressure within the body, and ANS damage is a common complication following brain injury whether it results from traumatic, sub-concussive, or non-traumatic events. ANS damage does not appear on an MRI or a CT scan.

The dizziness commonly reported by many athletes after a brain injury can be more accurately characterized as positional lightheadedness, exercise intolerance, and near-fainting. These symptoms are all a reflection of ANS damage resulting in poor blood and oxygen delivery to the brain, and are not damage of the balance (i.e. vestibular) system.

The ANS communicates with, and coordinates, the metabolic state of all of the cells in the human body. In simple terms, the sympathetic branch of the ANS is responsible for energy expenditure (“fight or flight”) and the parasympathetic branch of the ANS is responsible for energy conservation and restoration (“rest and digest”).

A common result of brain injuries, whether the injury was minor or non-traumatic, is damage to the sympathetic branch of the ANS. The sympathetic branch controls the bodies’ response to stress, pain, and cold. It increases heart rate, increases respiratory rate, and pushes blood from the extremities to core organs and muscles. The sympathetic branch, for example, increases the strength of the contractions of the heart, inhibits digestion, relaxes the bladder, dilates the pupils, and stimulates glucose release by the liver.

When the ANS functions properly a person feels no symptoms. When the ANS is no longer working properly after a brain injury, a person may feel symptoms that range from mild (feeling dizzy or a head rush when standing up from a chair) to completely debilitating.

The common and lingering symptoms of ANS dysfunction after a brain injury include being lightheaded or dizzy, syncope (passing out), heartburn, intestinal distress (cramping/constipation/frequent urination), frequent or recurrent headaches, chronic fatigue, chronic pain, chronic hunger, insomnia, depression, anxiety or panic attacks, temperature regulation problems, tingling and numbness (feet or legs, hands or arms, face or neck), cognitive difficulties, eyesight and pupil dilation problems (sensitivity to sunlight, night vision), or memory problems.

Until or unless the ANS dysfunction from a brain injury is healed, these symptoms may vary but they will never go away. Left untreated, ANS dysfunction can lead to decreased athletic performance, increased metabolic inflammation, and the early onset of illness and disease.

Sympathetic damage to the ANS is easily identified with a rapid, portable testing process known as spectral analysis. Monitoring autonomic recovery from the brain injury is done by repeating the test after several months to verify recovery or adjust the treatment protocol as needed.

Many athletes and former athletes suffer from the lingering effects of sports related traumatic brain injuries (concussions) or non-traumatic brain injuries. The reasons that many athletes do not fully recover from their brain injury because either their ANS is not tested and treated, or they do not yet know that they may have been injured by cumulative, repetitive, or non-physical events.