

Post-concussion syndrome

Post-[concussion](#) syndrome is a well-described complication following moderate and severe head trauma but whether it occurs after [mild traumatic brain injury](#) in children remains unclear.

Etiology

There are ongoing controversies regarding the etiology of persistent symptoms following mTBI.

Symptoms

These symptoms include prodromal symptoms such as [headaches](#) (65%–93%), [fatigue](#) (55%–82%), and [dizziness](#) (32%–75%), as well as specific neurocognitive and neuropsychiatric deficits such as difficulty concentrating (30%–57%), forgetfulness (34%–42%), and [Postconcussion Depression](#) (17%–24%).

Symptoms may include:

Sleep difficulties

Personality changes (e.g. increased irritability, emotionality)

Sensitivity to light or noise

Dizziness when standing quickly

Deficits in short-term memory, problem solving and general academic functioning

This constellation of symptoms is referred to “Post-Concussion Syndrome” and can be quite disabling

In some cases, such difficulties can be permanent and disabling.

In addition to Post-Concussion Syndrome, suffering a second blow to the head while recovering from an initial concussion can have catastrophic consequences as in the case of [Second Impact Syndrome](#) which has led to approximately 30-40 deaths over the past decade.

Virtually any symptom can be ascribed to the condition. Other symptoms that may be described by patients who are generally not included in the definition:

1. fainting (vaso-vagal episodes): may need to rule out posttraumatic seizures, as well as other causes of syncope
2. altered sense of taste
3. [dystonia](#) ¹⁾

Treatment

Hyperbaric oxygen therapy (HBOT) has been demonstrated as an effective method for treating acute and severe TBI, but its efficacy in PCS remains controversial.

The clinical studies have limitations: inappropriate Sham group using room air at 1.2 or 1.3 ATA; delayed HBO administration; subjective assessment methods; time point for outcome assessment and small sample size ²⁾.

Outcome

Most patients with PCS had multiple symptoms persisting for months or years. The median duration of PCS was 7 months, with a range up to 26 years. In only 11.3%, the PCS had ended at the time of consultation. Not all predictors commonly cited in the literature align with the findings in this study. This is likely due to differences in the definitions of PCS used in research. These results suggest that the use of ICD-10 and DSM-IV to diagnose PCS may be biased toward those who are vulnerable to concussions or with more severe forms of PCS. It is thus important to redefine PCS based on evidence-based medicine ³⁾.

Postconcussive syndrome after mild traumatic brain injury

see [Postconcussive syndrome after mild traumatic brain injury](#).

Case series

Tator et al., conducted a retrospective cohort study of 284 consecutive concussed patients, 221 of whom had PCS on the basis of at least 3 symptoms persisting at least 1 month. This definition of PCS was uniformly employed and is unique in accepting an expanded list of symptoms, in shortening the postconcussion interval to 1 month from 3 months, and in excluding those with focal injuries such as hemorrhages and contusions.

The 221 cases showed considerable heterogeneity in clinical features of PCS. They averaged 3.3 concussions, with a range of 0 to 12 or more concussions, and 62.4% occurred during sports and recreation. The median duration of PCS was 7 months at the time of examination, with 11.8% lasting more than 2 years, and 23.1% with PCS had only 1 concussion. The average patient age was 27 years (range 10-74 years). The average number of persistent symptoms was 8.1; 26.2% had a previous psychiatric condition, attention-deficit disorder/attention-deficit hyperactivity disorder, a learning disability, or previous migraine headaches. The prevalence of arachnoid cysts and Chiari malformation in PCS exceeded the general population. Additionally, involvement in litigation, presence of extracranial injuries, amnesia and/or loss of consciousness, and female sex were predictive of reporting a high number of symptoms. A prior history of psychiatric conditions or migraines, cause of injury, number of previous concussions, and age did not significantly predict symptom number. Only the number of symptoms reported predicted the duration of PCS. To predict the number of symptoms for those who fulfilled PCS criteria according to the International Classification of Diseases, 10th Revision (ICD-10), and the Diagnostic and Statistical Manual of Mental

Disorders, 4th Edition (DSM-IV), the number of previous concussions was significant.

PCS is commonly associated with multiple concussions, but 23.1% in the present series occurred after only 1 concussion. Most patients with PCS had multiple symptoms persisting for months or years. The median duration of PCS was 7 months, with a range up to 26 years. In only 11.3%, the PCS had ended at the time of consultation. Not all predictors commonly cited in the literature align with the findings in this study. This is likely due to differences in the definitions of PCS used in research. These results suggest that the use of ICD-10 and DSM-IV to diagnose PCS may be biased toward those who are vulnerable to concussions or with more severe forms of PCS. It is thus important to redefine PCS based on evidence-based medicine ⁴⁾.

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