Does Post-Concussion Syndrome Commonly Occur in Children

In the highly regarded Neurology Textbook, “Principles of Neurology,” by Adams and Victor, tenth edition, it is stated post-concussion syndrome is virtually unknown in children. However, a careful search of the scientific literature suggest otherwise.

In our latest Newsletter, “Post-Concussion Syndrome-Children” an in depth discussion of this issue is presented. You can also sign up here to receive our Forensic Science Newsletter by email.

Definition: Post-concussion syndrome (PCS) is a name given to symptoms that develop following a concussion, which persist for an extended time. Most concussions in children resolve in 7-10 days.

General Information: Most children and adolescent athletes return to their normal activities within two weeks. Those who develop post-concussion syndrome have symptoms, such as tiredness, headache, memory loss, dizziness, irritability, poor attention, depression, difficulty in concentration, sleep problems, and personality changes that last for at least one month.

Although, children who sustain a concussion (mild traumatic brain injury) have a more favorable outcome reference to cognitive, achievement, and behavior issues as compared to those who sustain moderate to severe traumatic brain injury, they can show adverse effects as manifested by cognitive and somatic symptoms and emotional and behavioral symptoms.

There are also other risk factors in both adults and children for the development of post-concussion syndrome symptoms following a mild traumatic brain injury.

Clinical Presentation of Post-Concussion Syndrome Symptoms in Children: There are two distinct groups of post-concussion syndrome symptoms in children in contradistinction to adults, cognitive and somatic symptoms and emotional and behavioral symptoms.

Studies have shown somatic symptoms seen in post-concussion syndrome are very similar to those seen in Post-Traumatic Stress Disorder.

Neuroanatomy as Related to the Clinical Presentation of Post-Concussion Syndrome, Children and Adults: Behavioral, cognitive and emotional control all rely on a network that has centers in the ventrolateral prefrontal cortex and orbitofrontal cortex with connections to the dorsal anterior insula, anterior mid-cingulate cortex, dorsolateral prefrontal cortex, medial frontal cortex, frontal pole, and lateral parietal cortex.

There are six components of the brain: frontal, parietal, occipital and temporal lobes, and the cerebellum and brainstem.
Frontal lobes are involved in planning, organizing, problem solving, selective attention, personality and a variety of “higher cognitive functions.”

Of the two functional regions of the parietal lobes, one is concerned with integrating sensory input to form a single perception (cognition).

Problems associated with temporal lobe dysfunction include: thinking (i.e., memory and reasoning) and language (i.e., communication, expression and understanding).

Although, the cerebellum is most understood for its contributing to motor control, it is also involved in certain cognitive functions, such as language.

The brainstem plays a vital role in basic attention, arousal and consciousness.

Other Injury Factors Associated with Post-Concussion Syndrome in Children with mild traumatic brain injury: loss of consciousness is associated with a higher incidence of cognitive post-concussion syndrome symptoms.

There are two non-injury characteristics, which moderate the effects of injury related factors in post-concussion syndrome: age and social economic status.

There are particular types of injury patterns, which suggest a greater incidence of brain insult and a greater number of post-concussion syndrome symptoms with mild traumatic brain injury.

Treatment: Under no circumstances are children or adolescents athletes who have sustained a concussion with or without post-concussion syndrome symptoms are to return to sports until all symptoms have cleared.

There will be an occasional child, adolescent or adult, who may experience depression with suicide ideation. Such patients are to be taken seriously and monitored closely.

What must be avoided at all cost is the child, adolescent or adult, experiencing another traumatic brain injury while they are still experiencing symptoms of a concussion or post-concussion syndrome symptoms. Such an eventuality can lead to the child, adolescents or adults death.

Pathophysiology: Recently, researchers investigating the underlying mechanisms of PCS have suspected activation of the immune inflammatory response (immunoexcitotoxicity) may be the underlying pathophysiologic mechanism that occurs in those patients who go on to develop PCS symptoms. For a more in depth review of this subject click on the link, “Post-concussion-Syndrome-Adults” read pages 3-11.

To gain a more in depth understanding of post-concussion syndrome in children please read our latest Forensic Science Newsletter, “Post-Concussion Syndrome-Children.” You can also sign up to automatically receive our Forensic Science Newsletter.