



## A Neurosurgeon's Guide to Sports-Related Head Injury

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Received date: 07 July, 2021; Accepted date: 21 July, 2021; Published date: 28 July, 2021

### Editorial Note

A definition of concussion is difficult due to the shortage of objective clinical and radiographic findings. There are usually no findings on routine imaging, like Computerized Tomography (CT), which makes the definition of concussion less clear than definitions of other sorts of brain injury. Definitions are offered by the department of defense, as have consensus statements from the concussion in sport group from Vienna and Prague. The foremost recent and agreed-on definition of concussion is that began within the Zurich consensus statement, which refined the Vienna and Prague definitions. The Zurich statement defines concussion as “A Complex Pathophysiological Process Affecting the Brain, induced by traumatic biomechanical forces.” This definition doesn't require loss of consciousness to diagnose concussion. Other features frequently present in concussion are a quick period of amnesia and anterograde amnesia. For practical purposes, the Cantu Grading Scale has been helpful in assessing severity of concussion and for creating return-to-play decisions. Grade 1 includes anterograde amnesia but half-hour and no loss of consciousness. Grade 2 is defined as loss of consciousness but 5 minutes or amnesia half-hour to 24 hours, and grade 3 includes loss of consciousness greater than 5 minutes or amnesia greater than 24 hours.

Each year, approximately 1.4 million people are hospitalized with Traumatic Brain Injury (TBI) within us, and an estimated 57 million people worldwide suffer from a TBI<sup>8</sup>. of those injuries, 20% occur secondary to physical activity and sports.<sup>18</sup> The Centers for Disease Control and Prevention estimates that 1.6 million and three .8 million treated and untreated concussions associated with sports occur

annually within us, respectively.<sup>16</sup> Recently, concussion has become a crucial issue of dialogue in athletics, as an understanding of the long-term effects of mild brain injury and concussion has begun to emerge. Repeated loss of consciousness for quite half-hour may increase risk of Alzheimer's disease, and amyloid proteins are seen as early as 2 hours after severe TBI.<sup>4</sup> More recently, as autopsies are conducted on boxers with dementia pugilistic and deceased football players, it's become apparent that repeated concussion even without more severe injury may put some athletes in danger for cognitive and psychological problems within the future. Consequently, it's important for those involved in athletics to acknowledge concussion, assess patients for concussion, rule out more severe injury, and safely navigate return-to-play decisions for these players.

Recently, concussion has become a subject of much discussion within sports. The goal of this review is to supply a summary of the literature concerning the definition of concussion, management of initial injury, return to play, and future health risks. Mild TBI may be a different yet potentially overlapping entity. Like concussion, various definitions are offered by the American Congress of Rehabilitation Medicine, the Centers for Disease Control and Prevention, the planet Health Organization, and therefore the American Academy of Neurology. A synthesis of those definitions from the planet Health Organization includes a TBI leading to a score of 13-15 on the Glasgow Coma Scale, without other factors, like acute drug abuse, other focal or systemic injuries, coexisting medical conditions, or penetrating craniocerebral injury. Additionally, it includes one among the following: confusion or disorientation, but half-hour of loss of consciousness, anterograde amnesia of but 24 hours, or transient neurologic abnormalities.

Though concussion patients typically have negative head imaging, imaging is warranted in those with severe mechanism, significant loss of consciousness, focal neurologic deficit, or worsening symptoms. The existence of “Second-Impact Syndrome,” whereby a primary minor head injury predisposes an athlete to later catastrophic injury, remains controversial; however, it's clear that concussion has significant effects on a patient and will be considered carefully in return-to-play decisions. A comprehensive understanding of concussion and its related risks is vital in making return-to-play decisions also as health care and league policy.

Citation: Sabistona C (2021) A Neurosurgeon's Guide to Sports- Related Head Injury. J Athl Enhanc 10:7