

The Current State of Sports Concussion



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KEYWORDS

- Brain injury • Head injury • Sport-related concussion • Return to play • Management
- Assessment • Concussion • Head trauma

KEY POINTS

- Concussion is a complex injury that requires a multimodal assessment and treatment process.
- The varying terminology and lack of consensus on treatment make it key for clinicians to educate and discuss expectations with patients and their families.
- The approach to concussion management should address all aspects of patients' lives, including daily activities and return to school, work, and sport.
- This multimodal approach should include a strong clinical evaluation with symptom, motor/balance, and neurocognitive considerations.
- Using these best practices, clinicians will have a more complete picture of the concussion puzzle initially and throughout the recovery process to guide decision-making and management.

CONCUSSION OVERVIEW AND DEFINITION

Sport-related concussion is one of the most complex sport-related injuries clinicians manage. In addition, there is increased societal interest and a growing body of evidence in the medical literature concerning the sequelae following concussion that is evolving at a rapid pace. Therefore, there are several concussion definitions and guidelines in which clinicians and the lay community turn for information and guidance. Because of the complexity of concussion (**Fig. 1**), these multiple definitions and guidelines often lead to variation in how an individual concussion is managed. Athletes may experience an injury that is managed in a conservative nature by a clinician, whereas

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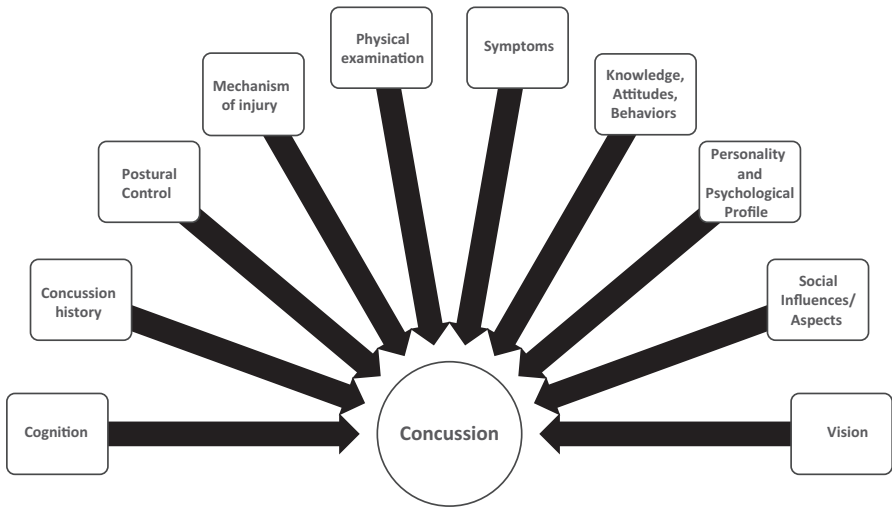


Fig. 1. The complexity of concussion.

other individuals who have similar presentations are minimized. Previously, it was common practice for an individual to only be diagnosed with a concussion if they experienced a loss of consciousness (LOC) and/or amnesia.¹ However, literature suggests that only 9% of concussed individuals also experience a LOC, whereas only 23% experience posttraumatic amnesia.² Despite literature suggesting that LOC has no bearing on severity of injury, including symptomology, neurocognition, and recovery,^{3–5} many of the available resources for concussion diagnosis imply the opposite. In addition, many individuals, especially in the sport community, still think that LOC always accompanies a concussion.⁶

Concussions are often distinguished as a subset of mild traumatic brain injury (TBI).⁷ Even though this subset is agreed on by experts in the field, the true definition of concussion is evolving and suffers from frequent disagreement in the use of descriptive terminology.⁸ In fact, in 2012, experts discussed not including *mild* when discussing a concussion but simply labeling concussion a brain injury to be sure the effects were not minimized.⁷ In recent years, experts continue to rely on a consensus process to determine appropriate components of a concussion definition, which include an injury that results from a blow to the head or body that causes an alteration in mental status and one or more of the following symptoms: headache, nausea, vomiting, dizziness/balance problems, fatigue, difficulty sleeping, drowsiness, sensitivity to light or noise, blurred vision, memory deficits, and difficulty concentrating.^{2,9} Other definitions include “a complex pathophysiological process affecting the brain, induced by traumatic biomechanical forces,”⁷ and “a clinical syndrome of biomechanically induced alteration of brain function, typically affecting memory and orientation, which may involve loss of consciousness.”¹⁰ Despite the varying definitions that exist, each contains the same basic components: a biomechanical mechanism, altered mental status, and some type of resulting, typically transient, symptomology. The International Concussion in Sport Group’s definition also highlights key clinical features of concussion such as the following: typically results in rapid onset of neurologic impairments, concussion is a functional, not structural, injury, may or may not include LOC, and is not identifiable on standard imaging (computed tomography [CT], MRI).⁷

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