

Sports Related Concussion

Acute Management and Chronic Postconcussive Issues

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KEYWORDS

- Sports-related concussion • Concussion treatment • Vestibular therapy
- Postconcussive syndrome • Return-to-learn • Return-to-play (return-to-sport)
- Neuropsychological testing

KEY POINTS

- Concussion is a functional rather than a structural injury that occurs after a blow to the head or body; standard neuroimaging results are normal and recovery may take up to 4 weeks in children and adolescents under the age of 18 (~10–14 days in adults).
- Cognitive and physical activity modifications are the hallmarks of initial management; prolonged physical and cognitive rest may impede recovery and lead to mood and/or anxiety disorders.
- Athletes with persistent symptoms or postconcussive syndrome should be referred to a vestibular therapist, ideally one with experience or specialty training in concussion management.
- Quality studies supporting pharmacologic treatments are lacking; however, concussion specialists often prescribe various over-the-counter and prescription medications targeting specific symptoms.
- Return-to-learn decisions should precede return-to-sport decisions through the implementation of published, step-wise protocols that are individualized by the clinician according to each student-athlete's particular circumstance, taking into consideration concussion, medical, psychiatric, and any other pertinent history.

INTRODUCTION

It has been said the occurrence and management of sports concussion provokes more debate and concern than virtually all other sports injuries combined.¹ Most concussions are managed by primary care physicians and sports medicine specialists.

Disclosures: The author has no commercial or financial conflicts of interest and no sources of funding to disclose.

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Child Adolesc Psychiatric Clin N Am ■ (2017) ■–■

<http://dx.doi.org/10.1016/j.chc.2017.08.005>

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Neurologists and psychiatrists are periodically consulted to aid in the management of athletes with persistent symptoms (postconcussive syndrome). The goal of this article is to highlight issues in sports-related concussion (SRC) that are germane to a practicing child and adolescent psychiatrist. Much of the information herein is gleaned from the 2017 Berlin Consensus Statement on concussion, which is generally considered to be the most authoritative document on SRC.

DEFINITION

According to the 2017 Berlin Consensus Statement on concussion in sport, authored by an international group of interdisciplinary experts known as the Concussion In Sport Group (CISG), “Sport related concussion (SRC) is a traumatic brain injury induced by biomechanical forces... may be caused either by a direct blow to the head, face, neck or elsewhere on the body with an impulsive force transmitted to the head. SRC typically results in the rapid onset of short-lived impairment of neurological function that resolves spontaneously. However, in some cases, signs and symptoms evolve over a number of minutes to hours.”²

Concussion, often referred to as a mild traumatic brain injury, is a functional disturbance of neurologic function rather than a structural injury, resulting in a wide range of clinical signs and symptoms that typically resolve sequentially and otherwise cannot be explained by substance or medication use, other injuries, or other illnesses. Standard neuroimaging with MRI or computed tomography (CT) is normal. Loss of consciousness (LOC) is relatively uncommon, occurring in about 5% of concussed high school athletes in a descriptive study using an online surveillance program.³

EPIDEMIOLOGY

The Centers for Disease Control (CDC) estimates that anywhere from 1.7 to 3.8 million concussions occur in the United States annually. These numbers likely underestimate the true incidence given that athletes underreport. For boys, incidence is highest in football, ice hockey, and wrestling; for girls incidence is highest in soccer, lacrosse, and basketball.^{4,5}

PATHOPHYSIOLOGY: NEUROMETABOLIC CASCADE

It is postulated that a concussion results in neuronal disruption that produces a neuro-metabolic cascade whereby potassium efflux, glutamate release, and lactate accumulation occur, as well as the consequent increased demand for glucose and adenosine triphosphate (ATP), among other factors, in an environment of relatively diminished cerebral blood flow. This supply-demand mismatch is thought to cause concussion symptoms.⁶

DIAGNOSIS

Concussion is a clinical diagnosis whereby the sideline evaluation is based on recognition of injury, assessment of symptoms, cognitive and cranial nerve function, and balance. Serial assessments are often necessary because symptoms may evolve over minutes to hours. The suspected diagnosis of SRC can include 1 or more of the following clinical domains, as described in the Berlin Statement:

1. Symptoms: somatic (eg, headache), cognitive (eg, feeling in a fog), and/or emotional symptoms (eg, lability)
2. Physical signs (eg, LOC, amnesia, neurological deficit)
3. Balance impairment (eg, gait unsteadiness)

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