

Just the Berries

Concussion

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Family physicians, particularly those who work in emergency rooms or act as physicians for sports teams, are often confronted with concussion. Although concussion can result from a variety of everyday activities, this article will focus on sports-related concussion.

When the injury happens, physicians must consider whether a player can resume play. If a player cannot resume play immediately, the issue arises of when it is safe for the player to return to the sport. Problems such as posttraumatic syndrome and second-impact syndrome must be considered when making this decision. The decision is difficult because there are currently no universally accepted guidelines for management of sports-related concussion.¹⁻³

Concussion has reached near-epidemic proportions in contact sports at both professional and amateur levels; there are an estimated 300 000 concussions a year in contact sports in the United States. The effects of concussion can have severe negative effects on athletes' scholastic abilities and can sometimes end a career.

To gather information for this review, I searched **Doctorsns.com** to find national and international guidelines, MDConsult for review articles, and PubMed from January 1999 to December 2002, using "concussion" as the search word.

Although there is controversy over the definition of concussion, the Canadian Academy of Sports Medicine (CASM) uses the Congress of Neurological Surgeons' definition: "a clinical syndrome characterized by immediate and transient posttraumatic impairment of neural function, such

as alteration of consciousness, disturbance of vision and/or equilibrium due to brainstem involvement."⁴

Signs and symptoms of concussion

According to CASM guidelines, if any one of the following symptoms or signs is present, head injury should be suspected and appropriate management provided. It is important to remember that a player does not need to have lost consciousness to have had a concussion:

- memory or orientation problems;
- unawareness of time, date, or place;
- unawareness of period, opposition, or score of game; and
- general confusion.

Typical symptoms include headache, dizziness, feeling "dinged" or stunned, "having my bell rung," feeling dazed, seeing stars or flashing lights, ringing in the ears, sleepiness, loss of field of vision, double vision, feeling "slow," and nausea. Typical physical signs include poor coordination or balance, vacant stare (glassy eyed), vomiting, slurred speech, slow to answer questions or follow directions, easily distracted, poor concentration, displaying unusual or inappropriate emotions (eg, laughing, crying), personality changes, inappropriate playing behaviour (eg, skating or running the wrong direction), and substantially lower playing ability from earlier in the game or competition.

Complications of concussion

Immediate complications of concussion include seizures and subdural or epidural hematomas. Delayed complications include posttraumatic syndrome and second-impact syndrome.

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Posttraumatic syndrome includes a constellation of symptoms including persistent headaches, fatigue, equilibrium disturbances, irritability, and impaired concentration. The etiology of this condition is unknown. It can persist for months or years and tends to be refractory to any kind of treatment.

Second-impact syndrome is a rare but often fatal condition that occurs when an athlete returns to competition while still suffering from the effects of a concussion. The syndrome is thought to involve loss of normal cerebral autoregulatory mechanisms leading to vascular engorgement, brain edema, increased intracranial pressure, subsequent herniation, and death. The second impact that provokes this syndrome can be minor.

There is evidence that the neurologic effects of a concussive event are cumulative and that people who have had multiple concussions seem to process information more slowly during neuropsychologic testing and take longer to recover than patients injured only once. These findings might have implications for those engaged in activities that place them at high risk of repeated concussions (eg, contact sports).^{5,6}

Return to play

Several protocols indicate when athletes can return to play: the Cantu Grading Scale For Concussion,⁷ the Colorado Medical Society Sports Medicine Committee's *Guidelines for the Management of Concussion in Sports*,⁸ and the *American Academy of Neurology Guidelines*.⁹ None of these guidelines are based on prospective studies; all are based only on expert opinion (level IV evidence).

A recent study has questioned the validity of guidelines that use loss of consciousness as a marker of the severity of concussion in making return-to-play decisions. Several current guidelines use this marker.¹⁰ Nevertheless, these are the tools we have to use at

present. The following is a summary of their suggestions. I have highlighted the definitions I find most useful.

Mild concussion

Mild (Grade 1) concussion is variously defined as no loss of consciousness, **or concussion symptoms or mental status abnormalities on examination that resolve in less than 15 minutes**. When assessing a player with a mild concussion with respect to return to play, it is necessary to obtain a thorough history and do a complete physical evaluation to rule out other injury (eg, spinal cord damage). *Any* symptom of concussion is cause to remove the player from the game. If results of examination are normal and there are no symptoms at rest or with exertion after 15 to 30 minutes, return to play can be considered.

Moderate concussion

Players with Grade 2 or 3 concussions should be withdrawn from play. Moderate (Grade 2) concussion is variously defined as loss of consciousness less than 5 minutes or posttraumatic amnesia longer than 30 minutes, confusion with amnesia, **or concussion symptoms or mental status abnormalities on examination that last more than 15 minutes**.

Guidelines suggest that, with moderate concussion, athletes can return to play after 1 week without symptoms. Patients must be asymptomatic at rest and with exertion. Players who sustain a second moderate concussion should refrain from play for 1 month, but can return to play after being symptom free for 1 week.

Severe concussion

Severe (Grade 3) concussion is variously defined as loss of consciousness longer than 5 minutes or posttraumatic amnesia longer than 24 hours, **or any loss of consciousness, either brief (seconds) or prolonged (minutes)**. Players with severe concussion may return after

1 month if they have been asymptomatic at rest and with exertion for at least 2 weeks. A second severe concussion will terminate the season, but the athlete can return to play the following season if he or she has no symptoms.



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"Just the Berries" for Family Physicians originated at St Martha's Regional Hospital in 1991 as a newsletter for members of the Department of Family Medicine. Its purpose was to provide useful, practical, and current information to busy family physicians. It is now distributed by the Medical Society of Nova Scotia to all family physicians in Nova Scotia. Topics discussed are suggested by family physicians, and in many cases, articles are researched and written by family physicians.

Just the Berries has been available on the Internet for several years. You can find it at www.theberries.ns.ca. Visit the site and browse the Archives and the Berries of the Week. We are always looking for articles on topics of interest to family physicians. If you are interested in contributing an article, contact us through the site. Articles should be short (350 to 1200 words), must be referenced, and must include levels of evidence and the resources searched for the data. All articles will be peer reviewed before publication.