GUIDELINES FOR THE ASSESSMENT AND MANAGEMENT
OF SPORT-RELATED CONCUSSION
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Introduction

Concussion is defined by the Congress of Neurological Surgeons as "a clinical syndrome characterized by immediate and transient post traumatic impairment of neural function, such as alteration of consciousness, disturbance of vision and/or equilibrium due to brain stem involvement". Sports related concussions are a significant problem. Between 1931 and 1986, there were over 800 deaths from North American football alone and currently there are estimated to be 300,000 concussions per year in contact sport in the United States.

A concussion may be sustained through a variety of mechanisms. A direct blow to the head, blow to the jaw, sudden twisting or shearing force and a sudden deceleration of the head [similar to a "whiplash" type injury] can all produce concussive signs and symptoms. In severe trauma, there may be bleeding or obvious damage to brain structures. In the more typical sport related concussion, no obvious damage is found on tests such as X-rays, CT scans and MRIs. It is unclear as to what happens to the brain but, after injury, it may not function normally and is vulnerable to further damage for a period of time. The exact length of this period of vulnerability is not known.

Concussion can cause a variety of symptoms. It is of critical importance to be aware of the fact that one does not have to lose consciousness to have had a concussion! Typical post concussive symptoms can include feeling dazed, "having your bell rung", memory problems, confusion, poor coordination, headache, and nausea. Return to play in a contact activity while still symptomatic is very dangerous. The most severe consequence is the "second impact syndrome"; this is a rare but usually fatal condition whereby even a seemingly mild blow to a previously concussed brain leads to massive brain swelling. Return to play while symptomatic has also been shown to increase the risk of further concussion, persistence of post concussive symptoms and other injury. Post concussive symptoms may also increase with any type of exercise following injury, so a gradual increase in exercise and return to play protocol should be used. It has also been shown that multiple concussions can lead to permanent, irreversible changes, such as memory loss, concentration problems, headaches etc.
While much has been learned about concussion, considerable controversy still exists in several areas. Numerous concussion-grading systems have been proposed, but are not based on scientific evidence. There is controversy related to the relative importance of loss of consciousness, posttraumatic amnesia, and post concussive symptoms in grading injury severity. It is therefore difficult to endorse any specific guideline. Return to play guidelines are similarly based on experience rather than evidence; it is still not known how long the brain is vulnerable following the concussive injury. Therefore, it is prudent to err on the side of caution in returning an athlete to play.

Protective equipment has been shown to reduce the risk and severity of head injury in sports. Approved helmets should be worn in all collision sports or activities with a risk of head trauma (e.g. cycling, in-line skating). Helmets should be kept in good condition and worn properly.

Currently, there is considerable interest in the medical and public sectors, as well as amateur and professional sport groups, in learning more about concussion, its safe management, and prevention. Important questions still exist, and there is an urgent need for answers. With this mandate, the Canadian Academy of Sport Medicine [CASM] Committee on Concussion has brought together a national group of interested and qualified CASM members to undertake the task of addressing these issues in the scientific, practical manner in order for CASM to authoritatively develop a guideline on this topic. CASM is attempting to provide leadership in this controversial field. Following a meeting of the committee at our annual conference, the following guidelines were agreed upon by the membership. The literature as pertains to each members’ area of expertise was reviewed, presented, and discussed. While the guideline is by no means a comprehensive accumulation of all available data, it is agreed that it represents a practical, usable consensus for use in the management of sport related concussion. As such, we have made a first step in the development of an ongoing critical update on this important injury.
A) SIGNS AND SYMPTOMS OF CONCUSSION

If any one of the following symptoms or problems is present, a head injury should be suspected and appropriate management provided:

*A player does not need to have lost consciousness to have had a concussion!!*

1) Memory or Orientation Problems
   - Unaware of time, date, place
   - Unaware of period, opposition, score of game
   - General confusion

2) Typical Symptoms
   - 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”
   - Nausea

3) Physical Signs
   - 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 (e.g. laughing, crying)
   - Personality changes
   - Inappropriate playing behaviour (e.g. skating or running the wrong direction)
   - Significantly decreased playing ability from earlier in the game/competition
B) ACUTE RESPONSE

When a player shows ANY symptoms or signs of a concussion:

1) The player should not be allowed to return to play in the current game or practice.
2) The player should not be left alone; monitoring for deterioration is essential.
3) The player should be evaluated by a medical doctor.
4) Return to play must follow a gradual process, monitored by a medical doctor.

_A player should never return to play while symptomatic!! “When in doubt, sit them out!”_

C) CONCUSSION GRADING AND RETURN TO PLAY GUIDELINES

Numerous concussion severity grading systems and return to play guidelines exist. None are based on scientific evidence. The area is still controversial, and no consensus exists amongst experts. Therefore, it is not possible to endorse a specific guideline. At this point, medical doctors should choose a system they are comfortable with to help them in this area. It would be prudent to choose a guideline which is conservative, and errs on the side of caution. Again, it is important to emphasize that no player should ever resume play while still symptomatic.

D) STEPS TO RETURN TO PLAY FOLLOWING A CONCUSSION

1) No activity, complete rest. Once asymptomatic, proceed to level (2). Continue to proceed to the next level if asymptomatic. If symptoms occur, drop back to a level where there are no symptoms, and try to progress again.

2) Light exercise such as walking or stationary cycling.

3) Sport specific activity (e.g. skating in hockey)

4) “On field” practice without body contact.

5) “On field” practice with body contact, once cleared to do so by a medical doctor. The time required to progress from full non-contact exercise to contact will vary with the severity of the concussion.

6) Game play.
E) PREVENTION

The risk of head injury is reduced by:

1) Wearing appropriate protective equipment. The equipment should be worn properly, and replaced when damaged.

2) Adhere to the rules of your sport. Play fair and play smart!

3) Respect your opponent.

Critical Points!

1) You do not have to lose consciousness to have had a concussion. Symptoms are often subtle.

2) Never return to play while symptomatic.

3) Follow a step-wise return to play.

4) Wear proper protective equipment.

These guidelines have been:
1) Reviewed and agreed upon by the CASM Concussion Committee and the CASM Board of Directors.
2) Modified from the “Heads Up” campaign, Sport Medicine Council of Alberta
3) Generalized to apply to child, youth, and adult amateur and elite sport. However, it is recognized that particular problems may be specific to the pediatric population and ongoing endeavors in this area are required.
4) Designed for use by athletes, coaches, trainers, therapists, and medical doctors to aid in concussion identification, reporting and decision making.

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REFERENCES


