

Concussion

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Introduction

- What is concussion?
- How is it recognized?
- How is it managed?







GETTY IMAGES

What is concussion?

- **A complex pathophysiological process affecting the brain, induced by traumatic biomechanical forces....**
 - **Causes: direct or indirect force**
 - **Rapid onset of short lived impairment that resolves spontaneously**
 - **Reflects functional disturbance, not structural**
 - **Usually grossly normal structural imaging studies**

Do different concussion sub types exist?

- **Clinical manifestations**
- **Anatomical localization**
- **Biomechanical factors (rotational v linear)**
- **Genetic phenotype**
- **Neuropathological change**
- **Undefined**

Background

- **Estimated 200,000-300,000 concussions per year in sports in US alone**
- **75% of concussions in sports DO NOT involve Loss of Consciousness (LOC)**
- **Is under-recognized**
 - **Concussion with LOC is obvious**
 - **75% that do not have LOC may be much less obvious**

Reasons for Under Reporting

- **Player lack of knowledge as to what compromises a concussion**
 - **Delaney, 2001: Only 16% of university football players who suffered a concussion knew what it was**
- **Concern about being removed from play**
- **COACHES!!!**

On the Sidelines of a Rugby Field

- **Player tackles opponent. Both players tumble to the ground.**
- **Opposing player immediately jumps to his feet**
- **Other player arises slowly and starts walking towards his own backs, slightly dazed.**
- **Complains of a headache and dizziness.**
- **Is oriented to person, place and time, but is unable to recall the current score.**
- **Symptoms abate after 10 minutes. He denies any other symptoms and desperately wants to continue in the game.**

The Questions

- **What is the appropriate decision about return to play for this player?**
 - **Return to this game?**
 - **Able to practice tomorrow?**
- **What type of sideline evaluation is appropriate?**
- **Is any follow-up needed?**

Management

Any signs of concussion:

- **The player should not return to game**
- **Player should be monitored**
- **The player should be medically evaluated**
- **Return to play should follow a stepwise process**

Return to play protocol

- 1. No activity, complete rest until asymptomatic**
- 2. Light aerobic exercise**
- 3. Sport specific training**
- 4. Non contact training drills**
- 5. Full contact training**
- 6. Return to play**

Recognizing concussion

- **Confusion and amnesia are cardinal features**
- **Pre and post impact amnesia**
- **Multiple manifestations**
- **Cognitive and psychometric assessment**
- **Imaging studies are usually normal. They do not contribute significantly to evaluation**

Key Questions

- **What is the score?**
- **Tell me about the hit. What is the last thing you remember ?(pre event amnesia)**
- **What is the first thing you remember after being hit ?(post event amnesia)**
- **Player appropriate simple test**
- **Ideally brief neuropsychological assessment**

Concussion Presentation: Possible Features

- **Vacant stare**
- **Delayed verbal and motor responses**
- **Inability to focus attention**
- **Disorientation**
- **Slurred or incoherent speech**
- **Gross observable incoordination**
- **Excessive emotionality**
- **Memory deficits**
- **Any period of loss of consciousness**

Commonly Reported Symptoms

Commonly Seen Early (min to hours)

- Headache
- Dizziness or vertigo
- Lack of awareness of surroundings
- Nausea and vomiting

Commonly Reported Symptoms: Seen Late (days to weeks)

- **Persistent low-grade headache**
- **Lightheadedness**
- **Poor attention and concentration**
- **Memory dysfunction**
- **Easy fatigability**
- **Irritability and low frustration tolerance**
- **Intolerance of bright lights or difficulty focusing vision**
- **Intolerance of loud noises, sometimes ringing in ears**
- **Anxiety and depressed mood**
- **Sleep disturbance**

Concussion Grading and Return-to-Play Guidelines: Why Worry?

- **Return to play with altered cognition and physical capability**
 - **Risk of additional injury**
- **Risk of “Second Impact Syndrome”**
 - **Blow to head of individual still symptomatic from previous mild brain injury**
 - **Rapid, diffuse brain swelling resulting most often in death**
 - **Controversial entity**

Concussion Grading and Return to Play Guidelines

- **As many as 25 different sets of criteria**
- **Little evidence-based support**
 - **Expert opinion**
 - **Consensus**
- **Opinion is moving to an individualized assessment**

General Guidelines:

- Any concussed player should be removed from competition, examined and observed
- Serial assessment of the player after the concussion
- Any evidence of deterioration, no matter how mild the injury: transport to hospital for appropriate evaluation
- Athlete with LOC, even momentary, or post-event amnesia should not be allowed to immediately return to play
- Post-concussed athlete cannot return to play until completely asymptomatic, both at rest and after exertion
- Multiple concussions may have a cumulative effect on the athlete

Neuropsychological Testing

- **Significant development recently**
- **Additional tool to evaluate recovery**
- **But:**
 - **Best tests yet to be demonstrated**
 - **Baseline testing should be done**
- **Computer and web-based testing may help**

Prevention of concussion

Law (rule) change

Protective gear

Education

Concussion: Summary

- **Most concussions in rugby do not involve LOC.**
- **Concussion is regularly missed**
- **Amnesia is the best measure of severity**
- **Concussion grading criteria RTP criteria have limited scientific grounding**
- **To avoid further injury concussed athletes should not return to play until completely asymptomatic, sometimes requiring a prolonged period of time**
- **Educate players and coaches**
- **Never take chances with children**

Thank You