

A person is seen from a high angle, skiing down a steep, snow-covered mountain slope. The skier is a small dark figure against the white snow. The background consists of a clear, bright blue sky with some wispy white clouds. The overall scene is a winter sports setting.

# *CONCUSSION IN WINTER SPORTS*

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# *Definition of concussion*

- ✿ **Concussion is defined as a complex pathophysiological process affecting the brain, induced by traumatic biomechanical forces.**

Journal of Sports Medicine in May 2009. <http://bjsm.bmj>.

**No abnormality on standard structural neuroimaging studies is seen in concussion.**

# Epidemiology

- ❖ **An estimated 15–20% of the approximately 600,000 annually reported skiing and snowboarding injuries are head injuries.**

Mueller BA, Cummings P, Rivara FP, Brooks MA, Terasaki RD *Epidemiology*. 2008 Mar; 19(2):270-6.

- ❖ **Most occurred early in the season and were mild traumatic brain injuries (TBI) (69.4%) as opposed to severe TBI based on Glasgow Coma Scale.**

Levy AS, Hawkes AP, Hemminger LM, Knight S J *Trauma*. 2002 Oct; 53(4):695-704.

- ❖ **Concussions represent 9.6% of all injuries in skiers, 14.7% of all injuries in snowboarders, and 5.7% of all injuries in snowbladers.**

Bridges EJ, Rouah F, Johnston KM *Br J Sports Med*. 2003 Dec; 37(6):511-5.

- ❖ **Skiers have a greater proportion of concussions (60% versus 21%), while snowboarders have a much higher proportion of severe brain injuries (29% versus 15%).**

Hentschel S, Hader W, Boyd M *Can J Neurol Sci*. 2001 Feb; 8(1):42-6.

# Pathophysiology

- ✿ **The current consensus is that it reflects a disturbance of brain function, rather than a structural injury.**
- ✿ **Research in animal models of concussion suggest that linear acceleration or rotational shearing forces may result in short-lived neurochemical, metabolic, or gene-expression changes.**
- ✿ **The concussed athlete, although conscious and without obvious focal neurological signs, may have impaired higher cortical function (e.g. impaired short-term memory).**
- ✿ **These subtle cognitive changes may only be detected by neuropsychological testing.**

**Carpenter R. The saccadic system: a neurological microcosm. *Adv Clin Neuroscj RelJab* 2004;4:6-8.**

# Management

## *field Management*

- ❖ **The clinical management of a concussed athlete may involve the treatment of a disorientated, confused, unconscious, uncooperative, or convulsing patient.**
- ❖ **The immediate treatment priorities remain the basic first aid principles of ABC- airway, breathing, circulation.**
- ❖ **Once this has been established and the patient stabilized, a full medical and neurological assessment examination should follow.**

# Management

## *field Management*

**A player with a suspected structural head injury requires immediate transport to a hospital with a neurosurgical unit, and an urgent computerized tomography (CT) brain scan to exclude intracranial pathology (e.g. hemorrhage, swelling), and to exclude/manage any associated cervical spine injury.**

# *Urgent imaging & Hospital referral*

- ✿ **Fractured skull**
- ✿ **Penetrating skull trauma**
- ✿ **Deterioration in conscious state following injury**
- ✿ **Focal neurological signs**
- ✿ **Confusion or impairment of consciousness >30 minutes**
- ✿ **Loss of consciousness >5 minutes**
- ✿ **Persistent vomiting or increasing headache post injury**
- ✿ **Any convulsive movements**
- ✿ **More than one episode of concussive injury in a match or training**
- ✿ **Where there is assessment difficulty (an intoxicated patient)**
- ✿ **All children with head injuries**
- ✿ **High-risk patients (e.g. hemophilia, anticoagulant use)**
- ✿ **Inadequate post injury supervision**
- ✿ **High-risk injury mechanism (high-velocity impact, missile injury)**

# Confirming the diagnosis

When  
assess  
The

## *Sideline Assessment - Maddocks Score*

*I am going to ask you a few questions, please listen carefully and give your best effort*

*Modified Maddocks questions (1 point for each correct answer)*

**At what venue are we at today?**

**Which half is it now?**

**Who scored last In this match?**

**What team did you play last week/game?**

**Did your team won the last game?**

# *Symptoms and signs*

## **Symptoms**

**Headache**  
**Dizziness**  
**Nausea or vomiting**  
**Unsteadiness or loss of balance**  
**Confusion**  
**Unaware of period, opposition, score of game**  
**Feeling "dinged," stunned, or "dazed"**  
**Seeing stars or flashing lights**  
 **ringing in the ears**  
**Double vision or blurred vision**

## **Signs**

**loss of consciousness or impaired conscious state**  
**Poor coordination or balance**  
**Concussive convulsion or impact seizure**  
**Gait unsteadiness or loss of balance**  
**Slow to answer questions or follow directions**  
**Easily distracted, poor concentration**  
**Displaying unusual or inappropriate emotions**  
**Vacant stare or glassy eyed**  
**Slurred speech**  
**Personality changes**  
**Inappropriate playing behavior**  
**Significantly decreased playing ability**  
**Double vision or blurred vision**

# *Making a decision*

- ❖ **Any player with symptoms and/or evidence of a disturbance of cognitive function (e.g. LOC, balance disturbance, disorientation, or cognitive deficit) can be considered to have a concussive injury.**
- ❖ **Once concussion is medically diagnosed, the player should be removed from the game or training and not return to play on that day.**

# Return to play

## 3 consensus

☀ Third international conference on concussion in sport was held in Zurich in the October of 2008, where **revisions** and further recommendations were made. Clinicians the world over have appreciated the concussion consensus meetings in Vienna (2001) and Prague (2004).



# *Return to play*

**Current return-to-play programs rely more on **symptoms** than **grading**.**

# 6 steps return to play

## Step 1

### *No Activity , Complete Rest*

- ☀ Once patient is asymptomatic proceed to step2 and continue to subsequent steps as long as the patient is asymptomatic.
- ☀ **If symptoms recur drop back to step where there are no symptoms and try to progress again.**

# 6 steps return to play

## Step 2

*Light exercise off the game field*  
**Stationary biking and walking**



# 6 steps return to play

## Step 3

*Sports specific activity without body contact*

**light running and skating**



# *6 steps return to play*

*Step 4*

*On field practice  
without body  
contact*



# 6 steps return to play

## Step 5

*On field practice with body contact, once cleared by a medical doctor*

**The time of Non contact to full contact depends on severity of concussion**

# *6 steps return to play*

*Step 6*

*Return to competition*



*Hooman Angoorani*

*Concussion*

# *Return to play*

☀ The minimum time allowed for **each step** in the return-to-play protocol is **1 day**, which means that **the concussed athlete will not be able to enter competition for approximately 1 week.**

# *Return to play*

It should be noted that even asymptomatic players may go on to develop concussive *symptoms minutes, hours, or possibly days later, so every concussed player should be visited by a physician.*

*THANKYOU*

