

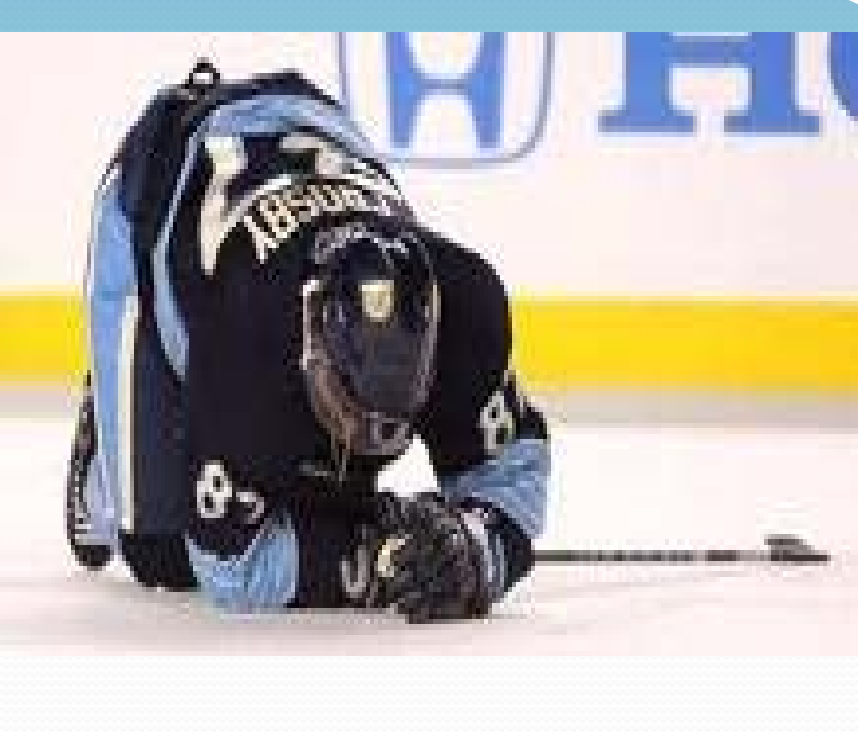
# Concussion in Sport – Current guidelines

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# Overview

- Concussion in Sport Group
- Definition of Concussion
- Diagnosis
- Treatment/Management
- Return to Play Protocol
- Complications
- Prevention



# Concussion in Sport Group

- 3 Major symposia on Concussion in Sport since 2001
- Most recent in Zurich in 2008
- Purpose were to provide recommendations regarding the safety and health of all athletes who suffer concussive injuries in sport
- Panel members and authors addressed issues of epidemiology, basic and clinical science, grading systems, cognitive assessment, research method, protective equipment, management, prevention, and long term outcome of concussion

# Definition of Concussion

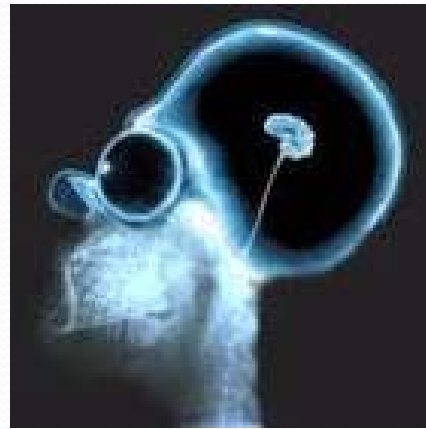
- A complex pathophysiological process affecting the brain, induced by traumatic biomechanical forces. Several common features that incorporate clinical, pathologic and biomechanical injury constructs that may be utilized in defining the nature of a concussive head injury include:
  - 1. Concussion may be caused by a direct blow to the head, face, neck or elsewhere on the body with an “impulsive force transmitted to the head.



# Definition

- 2. Concussion typically results in the rapid onset of short-lived impairment of neurologic function that resolves spontaneously.
- 3. Concussion may result in neuropathologic changes, but the acute clinical symptoms largely reflect a functional disturbance rather than a structural injury.
- 4. Concussion results in a graded set of clinical symptoms that may or may **NOT** involve a loss of consciousness. Resolution of the clinical and cognitive symptoms typically follows a sequential course, however it is important to note that in a small percentage of cases, post concussive symptoms may be prolonged

- 5. No abnormality on standard neuroimaging studies is seen in concussion.



- Canadian Pediatric Society definitions is based on the previous definition with an emphasis that concussion is an impact related MTBI.



# Incidence

- Year 2000, Wiler et al reported an overall head injury rate of 3.98 injured children per 100 in the province of Ontario
- Bakhos et al, ER visits 4/1000 8-13 year olds and 6/1000 in 14-19 year olds
- 1.6 to 3.8 million sport related concussions in US per year
- Often under reported
- Echlin Study 2010 – Incidence rate 3.3 times higher than previously reported.

# Evaluation

- First Aid measures to rule out cervical spine injury
- Loss of Consciousness call 911
- Immediate Removal from play
- SCAT<sub>2</sub>/Pocket SCAT<sub>2</sub>
  - Symptom evaluation
  - Physical Signs Score
  - Glasgow Coma Scale
  - Sideline assessment – Maddocks Score
  - Cognitive Assessment
  - Balance Exam
  - Co-ordination Exam
  - Cognitive Assessment



SCAT<sub>2</sub>

# SCAT2

Sport Concussion Assessment Tool 2



FIFA



Name: \_\_\_\_\_

Position: \_\_\_\_\_

Number of days: \_\_\_\_\_

Number of matches: \_\_\_\_\_

Age: \_\_\_\_\_ Sex: \_\_\_\_\_

Team name: \_\_\_\_\_

Event: \_\_\_\_\_

### What is the SCAT2?

This tool represents a simplified version of existing clinical history for concussion and can be used to screen your team. It does not take into consideration the original SCAT published in 2001. The tool has added the inclusion of the Concussion Assessment of Severe Trauma (CST) and the Modified Symptom Checklist (MCS) to enhance assessment.

### Instructions for using the SCAT2

The SCAT2 is designed for the use of medical and health professionals. However, training along with the SCAT2 can be useful for emergency and first aid staff. Alerts to safety throughout the SCAT2 are for information given by the athlete to the tester.

For more help for those using the assessment for individuals, teams, groups and organisations.

### What is a concussion?

A concussion is a disturbance in brain function leading to loss of consciousness for a few seconds or minutes or other specific symptoms like loss of memory and other signs and symptoms like dizziness, confusion, irritability, upset or the presence of **any** or **more** of the following:

- Symptoms such as headache, or
- Physical signs such as unsteadiness, or
- Feeling that something is not right, or
- Abnormal reflexes.

**Any athlete with a suspicion of concussion should be removed from play immediately without awaiting the return to play (RTP) assessment for both injury and about not about another player.**

## Symptom Evaluation

### How do you feel?

Do check with yourself to determine whether you are the best one.

	Not at all (0)	Slightly (1)	Moderate (2)	Severe (3)
Headache	00	01	02	03
Pressure in head	00	01	02	03
Nausea	00	01	02	03
Balance problems	00	01	02	03
Dizziness or light	00	01	02	03
Sensitivity to noise	00	01	02	03
Feeling slowed down	00	01	02	03
Feeling like "in a fog"	00	01	02	03
Loss of memory	00	01	02	03
Difficulty concentrating	00	01	02	03
Difficulty remembering	00	01	02	03
Blurred vision	00	01	02	03
Confusion	00	01	02	03
Drowsiness	00	01	02	03
Feeling being slowed down	00	01	02	03
More confused	00	01	02	03
Headache	00	01	02	03
Feeling like "in a fog"	00	01	02	03
Blurred vision	00	01	02	03
More confused	00	01	02	03

### Final history of symptoms (to be completed)

#### Subtotal severity score

00-03 = Mild 04-06 = Moderate 07-10 = Severe

Do you experience any more symptoms or signs?  No  Yes  
Do any symptoms or signs still persist about?  No  Yes

### Overall rating

Published the score and date in the next 24 hours to an athlete who is suspected to be the best one? (to be completed)

00-03 = Mild 04-06 = Moderate 07-10 = Severe

## Pocket SCAT2



FIFA



Concussion should be suspected in the presence of **any one or more** of the following symptoms such as headache, or physical signs such as unsteadiness, or impaired brain function (e.g. confusion or abnormal behaviour).

### 1. Symptoms

Presence of any of the following signs & symptoms may suggest a concussion:

- Loss of consciousness
- Seizure or convulsion
- Anisocoria
- Headache
- "Pressure in head"
- Neck Pain
- Nausea or vomiting
- Dizziness
- Blurred vision
- Balance problems
- Sensitivity to light
- Sensitivity to noise
- Feeling slowed down
- Feeling like "in a fog"
- "Don't feel right"
- Difficulty concentrating
- Difficulty remembering
- Fatigue or low energy
- Confusion
- Drowsiness
- More emotional
- Irritability
- Irritability
- Irritability
- Irritability

### 2. Memory function

Failure to answer all questions correctly may suggest a concussion:

- "At what venue are we at today?"
- "Which half is it now?"
- "Who scored last in this game?"
- "What team did you play last week / game?"
- "Did your team win the last game?"

### 3. Balance testing

Instructions for tandem stance

"Now stand heel-to-heel with your non-dominant foot in back. Your weight should be evenly distributed across both feet. You should try to maintain stability for 30 seconds with your hands on your hips and your eyes closed. I will be counting the number of times you move out of this position. If you stumble out of this position, open your eyes and return to the start position and continue balancing. I will start timing when you are set and have closed your eyes."

Observe the athlete for 30 seconds. If they make more than 3 errors such as lift the heel off the floor, open the eyes, lift the feet off the floor, touch, or fall, or return out of the start position for more than 5 seconds then this may suggest a concussion.

**Any athlete with a suspected concussion should be IMMEDIATELY REMOVED FROM PLAY, urgently assessed medically, should not be left alone and should not drive a motor vehicle.**

# Evaluation

- The player should not be left alone and should be closely monitored for deterioration of symptoms for the next few hours.
- Player should NOT be allowed to return to play.



# Signs and Symptoms



- Cover 5 clinical domains
- Symptoms – Somatic (e.g.. Headache), cognitive (e.g., in a fog), and/or emotional (angry)
- Physical Signs – Loss of consciousness or amnesia
- Behavioral Changes (irritability or nervousness)
- Cognitive Impairment (slowed reaction time)
- Sleep Disturbance (Fatigue or interrupted sleep)
- Only one symptom is required to diagnose concussion.



# Signs and Symptoms

- NO LOSS of CONSCIOUSNESS is required for concussion to occur.



# Management



- REST, REST, REST until ASYMPTOMATIC
- Most concussions resolve on their own in 7-10 days
- Physical Rest
  - Rest from all physical activity including sport
- Cognitive Rest
  - Rest from mental activity which may include a break from school, computer use, testing, iPods, video games, television, and loud music
- A person should be free of symptoms without the use of medication for 24 hours before any activity is attempted.

# Management

- Psychological Management
  - Emotional or Behavioral changes
- Pharmaceutical Management
  - Under the guidance of a licensed physician only
- These Guidelines do not apply to Children under the age of 10.
- Modifiers for these guidelines include:
  - Severity of signs and symptoms, number of concussions, style of play, risk of activity, comorbid conditions, medication use etc



# Return to Play Protocol

- 1. No Activity
  - Complete physical and cognitive Rest
    - Goal - Recovery
- 2. Light Aerobic Exercise
  - Walking, Swimming, or stationary cycling, keeping intensity to <70% of max heart rate. No resistance training.
    - Goal – Increase heart rate
- 3. Sport-Specific Exercise
  - Skating drills in ice hockey, running drills in soccer. No head impact activities
    - Goal – Add movement

# Return to Play

- 4. Non-Contact training drills
  - Progression to more complex training drills, e.g.. Passing drills in football and ice hockey, may start progressive resistance training.
    - Goal – Exercise, coordination and cognitive load
- 5. Full contact practice
  - Following medical clearance participate in normal training activities
    - Goal – Restore athletes confidence; coaching staff assesses functional skills
- 6. Return to Play
  - Normal Game Play

# Return to Play

- This protocol is to be initiated after a person is symptom free for 24 hours.
- Each step should take 24 hours
- If symptoms reoccur, a person is advised to drop back to the previous asymptomatic level and try to progress after another 24 hour period of rest has occurred.

# Complications of Concussion

- Second Impact Syndrome
- Post Concussive Syndrome
- Chronic Traumatic Encephalopathy

# Second Impact Syndrome

- Occurs when one returns to sport or activity without recovery from an initial concussion
- Can cause rapid and severe brain swelling
- Can lead to death or permanent disability
- No current statistics on incidence or prevalence
- Younger patients and children are more susceptible

# Post Concussive Syndrome

- An array of symptoms that persist in the days/weeks following a concussion.
- Can include dizziness, fatigue, irritability, difficulty concentration or performing mental tasks, memory impairment, intolerance to stress, emotional excitement or alcohol.
- Incidence can vary depending on diagnostic criteria but typically between 11 and 40% of patients.
- Difficult to diagnose in children due to developmental stages as well as co-existing conditions such as ADHD and learning disabilities.

# Chronic Traumatic Encephalopathy

- AKA Dementia Pugilistica or Punch Drunk Syndrome
- Associated with memory disturbances, behavioral and personality changes, Parkinsonism, speech and gait abnormalities
- Neuropathological changes found on autopsy
- Brain Bank at Boston University. Earliest incidence on a case report is of an 18 year old male multisport athlete.

# Prevention

- Protective Equipment
  - Helmets reduce impact forces to the head. Must be used and fitted properly
  - Mouth Guards proven to prevent dental injury but prevention of concussion in controversial at best



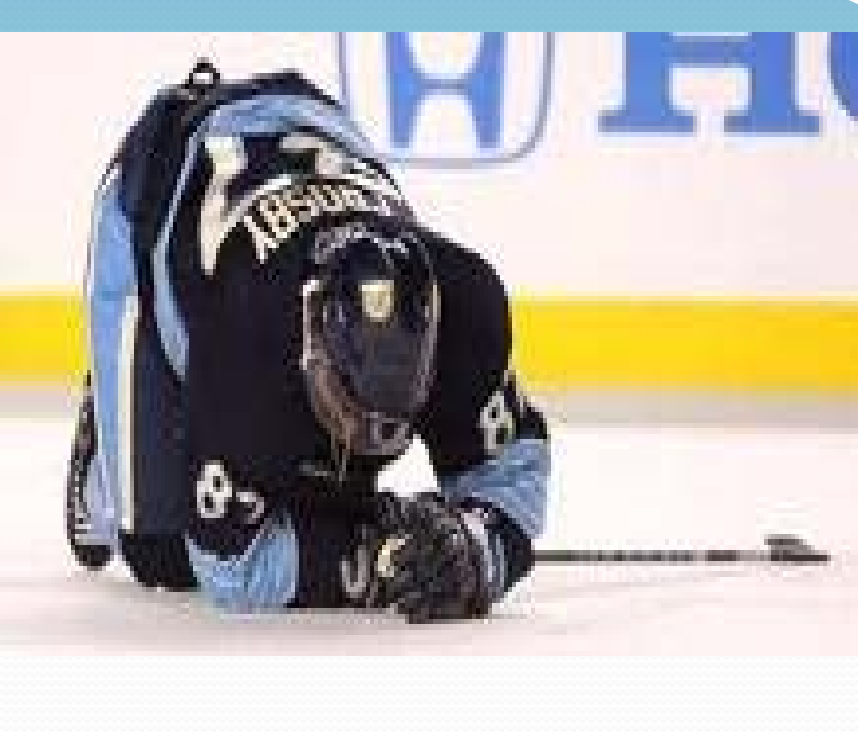


# Prevention

- Education
  - Parents, coaches and athletes
  - Signs and symptom of concussion
  - Fair Play and Respect
- Education programs/sites
  - [Sportconcussions.org](http://Sportconcussions.org)
  - [Thinkfirst.ca](http://Thinkfirst.ca)
  - Hockey Canada
  - Dr. Tom Pashby Sports Safety Fund

# Prevention

- Baseline Neuropsychological Testing
  - IMPACT test
- Behavioral Change
  - Rule Change
  - Risk Seeking Sports and Activities
  - Risk Compensation
  - Unnecessary violence





# Thank you!

Questions?