



Mild Traumatic Brain Injury/Concussion Report 2014

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Introduction

The purpose of this report is for Headwest, Brain Injury Association of WA Inc to provide Worksafe with general information with regard to Mild Traumatic Brain Injury / Concussion to inform them in administering Occupational Safety and Health in the workplace in Western Australia.

Headwest, Brain Injury Association of WA Inc, systemic advocacy goals extend to disseminating up to date information to the West Australian public on matters relating to Acquired Brain Injury – to which Mild Traumatic Brain Injury (mTBI) is a subset.

There has been a recent increase in new research and information available with regard to mTBI / sports concussion and particularly the long term effects of repeated concussions. (Rushworth, 2012) (Tator, 2012). As a consequence of this new research a number of issues have been highlighted:

1. Many people are uninformed about the signs and symptoms of mTBI / concussion and the guidelines for management. (Rushworth, 2012) (Tator, 2012).
2. Further efforts must be made to enhance community level concussion education to aid in prevention (Tator, 2012).
3. With the flurry of new information and research being published it is necessary for relevant organisations and associations to continually update their knowledge on concussion (Tator, 2012).

Definition of Acquired Brain Injury and Traumatic Brain Injury

Acquired Brain Injury (ABI) refers to any damage to the brain after birth. The five main causes of ABI are; accident or trauma, stroke, brain infection, drug and alcohol misuse and disease. An ABI can affect cognitive, physical, emotional and independent functioning. These impairments may be either temporary or permanent and cause partial or total disability (Fortune & Wen, 1999).

In Western Australia a conservative estimate shows that 2.3% of the population or 57,440 individuals have an ABI – 2,300 per 100,000 people. This is based on Western Australia's current population of 2,497,500. (ABS, 2013) (ABS, 2013 – Requested Conditions).

The term Traumatic Brain Injury (TBI) is used to describe and ABI that resulted from accident or Trauma. A TBI occurs when an external force from, for example, a fall or motor vehicle accident injures the brain. Direct impact to the brain together with rapid acceleration or deceleration of brain tissue can cause damage, swelling, inflammation, and internal bleeding (Center, 2011).

Mild Traumatic Brain Injury (mTBI).

A Mild Traumatic Brain Injury (mTBI) or concussion is a low-velocity accident or trauma to the head that may not result in a loss of consciousness but can result in a number of physical, cognitive and emotional disruptions. Concussion is a more widely recognised word used to describe mTBI, both terms are used interchangeably in this document. (Gioia, et al., 2008) (McCrory, et al., 2012) (Rushworth, 2012).

According to the *Mild Traumatic Brain Injury Committee* of the American Congress of Rehabilitation Medicine the definition of a mTBI is as follows:

“Definition

A patient with mild traumatic brain injury is a person who has had a traumatically induced physiological disruption of brain function, as manifested by at least one of the following:

1. any period of loss of consciousness;
2. any loss of memory for events immediately before or after the accident;
3. any alteration in mental state at the time of the accident (eg, feeling dazed, disoriented, or confused); and
4. focal neurological deficit(s) that may or may not be transient;

but where the severity of the injury does not exceed the following:

- loss of consciousness of approximately 30 minutes or less;
- after 30 minutes, an initial Glasgow Coma Scale (GCS) of 13-15; and
- posttraumatic amnesia (PTA) not greater than 24 hours.

Comments

This definition includes:

1. the head being struck
2. the head striking an object, and
3. the brain undergoing an acceleration/ deceleration movement (i.e, whiplash) without direct external trauma to the head.” (ACRM, 1993).

It also helpful to note the definition of concussion as defined by recent *Consensus Statement on Concussion in Sport in Zurich*:

“Concussion is a brain injury and is defined as a complex pathophysiological process affecting the brain, induced by biomechanical forces. Several common features that incorporate clinical, pathologic and biomechanical injury constructs that may be utilised in defining the nature of a concussive head injury include:

- Concussion may be caused either by a direct blow to the head, face, neck or elsewhere on the body with an "impulsive" force transmitted to the head.
- Concussion typically results in the rapid onset of short-lived impairment of neurological function that resolves spontaneously. However, in some cases, symptoms and signs may evolve over a number of minutes to hours.
- Concussion may result in neuropathological changes, but the acute clinical symptoms largely reflect a functional disturbance rather than a structural injury and, as such, no abnormality is seen on standard structural neuroimaging studies.
- Concussion results in a graded set of clinical symptoms that may or may not involve loss of consciousness. Resolution of the clinical and cognitive symptoms typically follows a sequential course. However, it is important to note that in some cases symptoms may be prolonged”. (McCrory, et al., 2012).

Concussion how they happen

Concussion can happen very easily and many are from minor accidents, for example, banging your head getting into a car, walking into a low door way, or slipping over in the street. (Headway, 2014).

Other common reports of concussion are from:

- motor vehicle, bike or skateboarding accident,
- playing sports – particularly contact sport,
- recreation activities,
- falls,
- assault - shaking, hitting, or throwing,
- exposure to blasts (Gioia, et al., 2008).

Concussion data and statistics

Please note that Headwest is currently obtaining 2008 - 2013 emergency and hospital data with regard to mTBI / concussion in Western Australia and will update this report as soon as the information is available.

Hospital and emergency data under-estimate the true burden of concussion on society as the majority of people who have a concussion do not seek medical attention. (Rushworth, 2012) (Iverson, 2005) (Finch & Clapperton, 2013). It is more common for individuals to visit their doctor after mTBI resulting in the patient and family members being sent home with instructions to look out for signs of neurological deterioration (Fung, et al., 2006).

Stroke is the most common ABI followed by Traumatic Brain Injury. Between 2004 and 2005 TBI accounted for an estimated 22,710 hospitalisations in Australia (Rushworth, 2012). Assessed direct hospital costs for all TBI in the 2004–05 financial year was \$184 million. It is estimated that between 70-90% of all adult TBI injuries treated at hospital fall into mTBI category (Finch & Clapperton, 2013).

Concussion signs and symptoms

Concussion is diagnosed after a low-velocity accident or trauma to the head with one or more of the following symptoms:

1. headache
2. amnesia
3. blurred vision
4. dizziness
5. nausea
6. balance problems
7. fatigue
8. irritability
9. sleep disturbance
10. confusion and disorientation
11. light sensitivity
12. numbness/tingling
13. poor concentration
14. convulsions, seizures
15. loss of consciousness

(Finch & Clapperton, 2013) (Fung, et al., 2006) (Gioia, et al., 2008) (Holm, et al., 2005) (Gioia, et al., 2008) (Rushworth, 2012).

- Loss of consciousness is reported in 10%–20% of cases (Finch & Clapperton, 2013).

- Symptoms are variable and may only last minutes. Typically maximal symptoms are felt within the first 72 hours with rapid improvement in functioning over the first week. Resolution of symptoms within 2–14 days, although a small subset takes longer to recover. (Iverson, 2005) (Gioia, et al., 2008).
- Symptoms are variable and may last for as short as several minutes and last as long as several days, weeks, months, or even longer in some cases.
- In the absence of a concussion test diagnosis is usually made on the patient's self-report, and then whether the observations by the physician and others are consistent (Rushworth, 2012) (Silver, 2012).

Concussion treatment and recovery

Post-concussion evaluation and management by a health professional should be carried out as soon as possible after the injury. In a medical emergency go to the nearest hospital emergency department or call an ambulance (dial 000).

It is noted that currently there is a lack of standardised tools or defined methods for diagnosing, treating and managing concussion. (Gioia, et al., 2008).

Management of a concussion usually rests with the doctor to inform the patient what to look out for in case of neurologic deterioration after discharge. (Fung, et al., 2006).

2006 research entitled "*A proposal for evidence-based emergency department discharge form for mild traumatic injury*" emphasises the importance of patient discharge information saying that instruction to caregivers should be "simple, precise and relevant" and written advice is preferable over verbal instructions. (Fung, et al., 2006).

Please see pages 10 and 11 to view the Victorian Governments "Minor head injury – Emergency department factsheets".



Minor head injury

health

Emergency department factsheets

General

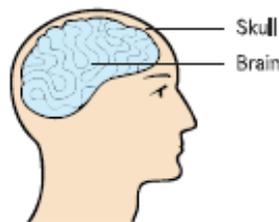
What is a minor head injury?

The most common type of minor head injury is concussion. Concussion may be associated with loss of consciousness ('a blackout'). This is often brief and is normally followed by a rapid and complete recovery.

What causes a minor head injury?

The skull and facial bones are hard and they protect the brain, which is soft.

When someone has a knock to the head, their brain moves inside the skull and facial bones, and can be injured and cause a person to 'black out'. Sometimes there can be a skull fracture (although this is rare with a mild head injury).



What are the symptoms?

A person with a minor head injury may have bruising, swelling and bleeding anywhere around or inside the brain. These symptoms will vary, depending on how the injury happened.

Some people will 'black out' for a short period. Headache or pain is common. Some people are confused about where they are and what has happened.

Treatment

While in the emergency department, the injured person will be closely monitored and may have:

- mild painkillers for headache or pain
- nothing to eat or drink until further advised
- anti-nausea medication for any nausea or vomiting
- a CT scan of the brain, neck or bones (if needed)
- an X-ray of the neck if there is neck pain or a suspicion of neck injury
- a hard collar on their neck and be laying flat, to prevent them from moving their head, so protecting their spine.

If the injury is mild, they will be sent home with family or friends. Please ask for a certificate for work if needed.

Home care

- Rest quietly for the day.
- Use 'ice packs' over swollen or painful areas. To do this wrap ice cubes, frozen peas or a sports ice pack in a towel. Do not put ice directly on the skin.
- Take simple painkillers (such as paracetamol) for any headache. Check the packet for the right dose and use only as directed. Aspirin should be avoided.

Some injured people may be confused or 'groggy', and need care and supervision over the following 24 hours.

If an injured person is discharged from hospital in the evening, make sure they are woken several times during the night. Set the alarm. Ensure the injured person walks to the toilet or does an activity that allows you to assess their coordination.

- **Do not** let the injured person drive home.
- **Do not** leave them alone for the next 24 hours.
- **Do not** let them drink alcohol for at least 24 hours.
- **Do not** let them eat or drink for the first six to 12 hours (unless advised otherwise by the doctor). Then offer them food and drink in moderation.
- **Do not** let them take sedatives or other medication unless instructed.

What to expect

Many people cannot remember events before or after their head injury (*amnesia*).

It can take some time for the brain to recover. During this time headaches and mild cognitive problems (such as difficulty concentrating, remembering things, performing complex tasks, and mood changes) are common. It is also normal to feel more tired than usual.

Most people make a full recovery and the symptoms last only a few days. There is no specific treatment other than plenty of rest.



Minor head injury

Emergency department factsheets

health

General

Do not return to work or school until fully recovered. The length of time depends on the type of work or study and the severity of the head injury. Ask your local doctor for advice.

Do not return to sport until all symptoms have gone for at least a week. This is because your reaction times and thinking will often be slower, putting you at risk of further injury. It is important to avoid another head injury before fully recovering from the first, as a second injury can cause additional damage.

Some people will have ongoing problems. If this is the case, see your local doctor.

Notes:

Seeking help



In a **medical emergency** go to the nearest hospital emergency department or call an ambulance (dial 000). Do this if the injured person:

- repeatedly vomits
- "blacks out"
- has a seizure (fit)
- cannot be woken or is not responsive
- has vision disturbance
- has weakness or numbness
- has severe or worsening headaches.



For other medical problems see your local doctor or health care professional.



For health advice from a Registered Nurse you can call **NURSE-ON-CALL 24 hours a day** on **1300 60 60 24** for the cost of a local call from anywhere in Victoria.*

NURSE-ON-CALL provides access to **interpreting services** for callers not confident with English. Call **1300 60 60 24**.

*Calls from mobile calls may be charged at a higher rate



Want to know more?

- Ask your local doctor or health care professional.
- Visit the **Better Health Channel**
www.betterhealth.vic.gov.au

If you would like to receive this publication in an **accessible format**, please phone 9096 0578 or email edfactsheets@health.vic.gov.au



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Disclaimer: This health information is for general education purposes only. Please consult with your doctor or other health professional to make sure this information is right for you.

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Current guidelines recommend a period of cognitive and physical rest in the early post injury period because symptoms can increase with cognitive and physical exertion. (Leddy, et al., 2012) (Rushworth, 2012). The majority (80–90%) of concussions resolve within 7 -14 to days (Iverson, 2005) (McCrory, et al., 2012):

New research discusses the importance of ensuring patients are symptom free before returning to any physical activity that might cause a repeated concussion as this increases the risk of developing chronic encephalopathy, cognitive impairment, early onset dementia, movement disorders, psychiatric disorders, and, potentially, motor neuron disease (Hughes, 2013) (Rushworth, 2012).

Driving after a mTBI.

In 2010 the journal Neuropsychology published research that looked at the effect of mTBI on drivers' hazard perception abilities. Results showed that participants with mTBI's were significantly slower to respond to traffic hazards than participants with minor orthopaedic injuries. Taking this into account patients with a mTBI should be advised not to drive for at least the first 24 hours post-injury - ideally not driving at all until they are symptom free (Preece, et al., 2010).

Post Concussion Syndrome

Post-Concussion Syndrome (PCS) is defined by the World Health Organization as the presence of three or more concussion symptoms that persist beyond three weeks of injury. However, the diagnosis of PCS is made difficult by the many and varying symptoms of concussion plus other reported symptoms of depression and chronic pain. (Leddy, et al., 2007). Existing medical conditions that were not due to the mTBI also need to be taken into account. (Silver, 2012).

Currently there is considerable debate regarding PCS due to the non-specificity of symptoms and the fact that most cognitive deficits resolve within 1 to 3 months after mild TBI (Leddy, et al., 2012).

There is also confusion regarding the long term treatment of PCS. Traditionally PCS patients are advised to continue with physical and cognitive rest whilst symptoms remain. However, it is noted that long term rest can lead to secondary symptoms such as depression, fatigue and the “physiology of inactivity”) (Leddy, et al., 2007).

Injury Prevention

The majority of mTBI injury prevention focusses on protection.

Protective Equipment - Helmets

There is much debate about whether protective equipment, such as helmets, prevent concussion. Within recreational and sporting activities such as skiing, snowboarding, cycling, motor and equestrian sports, research shows that wearing protective helmets prevents major brain injuries such as skull fractures. (McCrory, et al., 2012) (Roberts et al., 1996) (Rushworth, 2012).

Within Western Australia it is compulsory for all cyclists to wear a helmet. According to the Office of Road Safety “cyclists who do not wear helmets are twice as likely to suffer head, brain and facial injuries as cyclists who wear helmets”. (Office of Road Safety, 2014).

Within Western Australia it is against the law for a motorbike rider to not being wearing a securely fitted helmet (Office of Road Safety, 2014).

The Office of Road Safety recommends that all Skateboarders, non-motorised scooter riders, rollerskaters and rollerbladers wear helmets to prevent head injuries. (Office of Road Safety, 2014).

Education and Awareness

According to the recent *Consensus Statement on Concussion in Sport* in Zurich there is an immediate need for health promotion approaches to be used to increase community knowledge, guidelines and education resources with regard to head injuries (McCrory, et al., 2012).

Advice Disclaimer

The advice provided in this report is for the purposes of information only. We have not conducted any independent review to verify the accuracy of the information provided.

The advice set out in this report is general in nature and is based on our understanding of the research and statistics currently available.

This report is not a basis for treatment or diagnostic applications and professional advice should be sought from a suitably qualified healthcare professional.

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