



THE MANAGEMENT OF CONCUSSION IN AUSTRALIAN FOOTBALL

with specific provision for
children 5–17 years

AFL RESEARCH BOARD
AFL MEDICAL OFFICERS' ASSOCIATION



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This document has been published by the AFL as a position statement on the management of concussion in Australian Football. It is based on guidelines developed by the AFL Medical Officers' Association which incorporate research that has been funded by the AFL Research Board and which was undertaken by Assoc Prof Gavin Davis, Dr Michael Makdissi and Prof Paul McCrory.

The guidelines should be adhered to at all times. Decisions regarding return to play after concussive injuries should only be made by a medical doctor with experience in concussive injuries.

March, 2013



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Gavin Davis, Michael Makdissi,
Paul McCrory – March 2013

For trainers, first-aid providers, coaches,
umpires, club officials and parents

Summary

- » Any player who has suffered a concussion or is suspected of having a concussion must be medically assessed as soon as possible after the injury and must not be allowed to return to play in the same game or train in the same practice session.
- » There should be a trained first aider at every game and the principles of first aid should be used when dealing with any player who is unconscious or injured.
- » A concussed player must not be allowed to return to school or return to training or playing before having a formal medical clearance.

For children (players aged 5-17)

- » The child is not to return to play or sport until they have successfully returned to school/learning, without worsening of symptoms. Symptom assessment in the child often requires the addition of parent and/or teacher input.
- » It is reasonable for a child to miss a day or two of school after concussion, but extended absence is uncommon.



Background

Introduction

In considering the best practice management of concussion in sport, the critical element remains the welfare of the player, both in the short and long term.

Since 2001, four international conferences have been held to address key issues in the understanding and management of concussion in sport. Following each of these meetings, a summary has been published to “improve the safety and health of athletes who suffer concussive injuries during participation in sport”. The most recent conference was held in Zurich in November 2012. The summary from the Zurich meeting provides the most up-to-date knowledge on concussion in sport. It also outlines the current best practice management guidelines.(1)

As part of the 2012 meeting, specific recommendations were made for the management of children. Children require a different approach from adults because their brains are developing, and they need to continue learning and acquiring knowledge. As such, the priority is not just player welfare and return to play, but a critical element is return to school and learning.

What is concussion?

“Traumatic brain injury” is the broad term used to describe injuries to the brain that are caused by trauma. The more severe injuries typically involve structural damage, such as fractures of the skull and bleeding in the brain. Structural injuries require urgent medical attention. Concussion typically falls into the milder spectrum of traumatic brain injury and reflects a disturbance in brain function. Concussion does not involve structural damage or any permanent injury to the brain tissue.

Concussion is caused by trauma to the brain, which can be either direct or indirect (e.g. whiplash injury). When the forces transmitted to the brain are high enough, they can “stun” the nerves and affect the way in which the brain functions. This results in a range of symptoms and signs depending on the area of the brain that is affected. Common symptoms of concussion include headache, blurred vision, dizziness, nausea, balance problems, fatigue and feeling “not quite right”. Other common features of concussion include confusion, memory loss and reduced ability to think clearly and process information. Loss of consciousness is seen in only 10-20% of cases of concussion in Australian football. That is, the footballer does not have to lose consciousness to have a concussion.

Because we are dealing with a functional injury rather than structural damage, the changes are temporary and recover spontaneously if managed correctly. The recovery process however, is variable from person to person and injury to injury. Most cases of concussion in Australian football recover within 10-14 days of injury, however in a small number of cases, recovery is delayed over weeks to months.

How common is concussion in Australian football?

Concussion is a relatively common injury in Australian football. The overall incidence rate is 5-6 concussions per 1000 player hours, which equates to an average of 6-7 injuries per team per season.

What are the potential complications following concussion?

A number of complications can occur following concussion. These include:

- » Higher risk of injury or repeated concussion on return to play;
- » Prolonged symptoms (lasting more than 14 days);
- » Symptoms of depression and other psychological problems;
- » Severe brain swelling (particularly in young players); and
- » Long term damage to brain function.

In general, complications are not common. The risk of complications is thought to be increased by allowing a player to return to play before they have recovered. This is why it is important to recognise concussion, make the diagnosis and keep the player out of training and competition until the player has recovered.

Concussion symptoms can cause problems with memory and information processing, which interferes with the player's ability to learn in the classroom. It is for this reason that a child is not to return to school until medically cleared to do so.

Management guidelines for Suspected Concussion

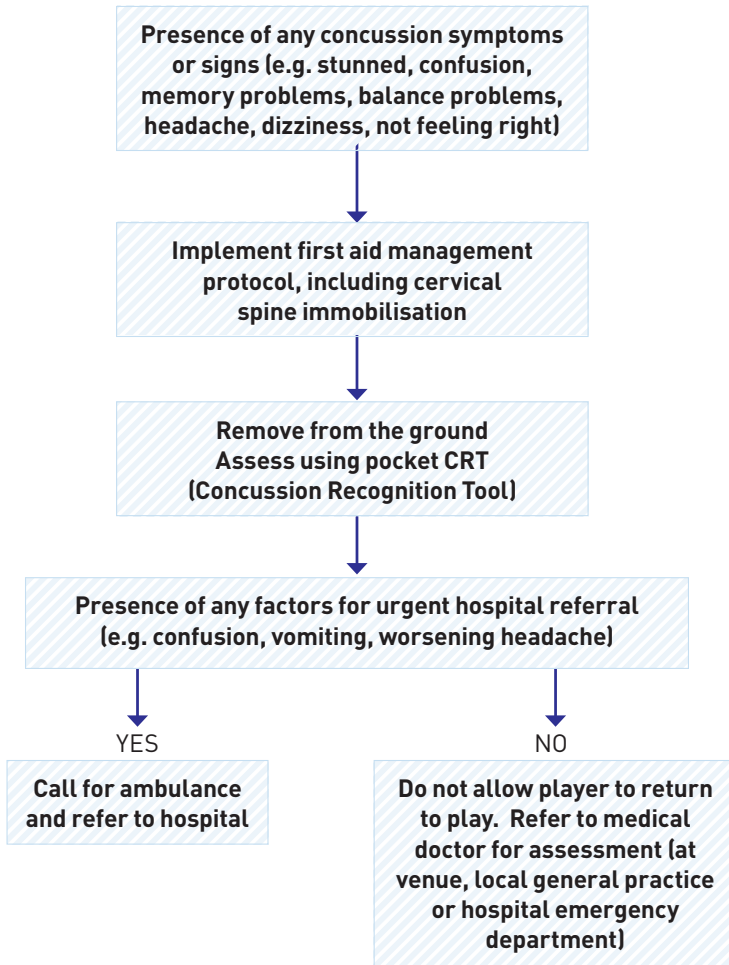


Figure 1. Summary of the management of concussion in Australian football.

*Note: for any player with loss of consciousness, basic first aid principles should be used (i.e. Airways, Breathing, CPR...). Care must also be taken with the player's neck, which may have also been injured in the collision. An ambulance should be called, and these players transported to hospital immediately for further assessment and management.

A. Game-day management

The most important steps in the initial management of concussion include:

1. **Recognising the injury;**
2. **Removing the player from the game**
3. **Referring the player to a medical doctor for assessment.**

1. RECOGNISING THE INJURY

» Visible clues of suspected concussion

Any one or more of the following visual clues can indicate a possible concussion:

- **Loss of consciousness or responsiveness**
- **Lying motionless on ground/Slow to get up**
- **Unsteady on feet/Balance problems or falling over/Incoordination**
- **Grabbing/Clutching of head**
- **Dazed, blank or vacant look**
- **Confused/Not aware of plays or events**

- » Loss of consciousness, confusion and memory disturbance are classical features of concussion. The problem with relying on these features is that they are not present in every case.
- » Other symptoms that should raise suspicion of concussion include: headache, blurred vision, balance problems, dizziness, feeling “dinged” or “dazed”, “don’t feel right”, drowsiness, fatigue, difficulty concentrating or difficulty remembering.
- » Tools such as the pocket Concussion Recognition Tool (see appendix) can be used to help recognise concussion.
- » It is important to note however that brief sideline evaluation tools (such as the pocket Concussion Recognition Tool) are designed to help recognise a concussion. They are not meant to replace a more comprehensive medical assessment and should never be used as a stand-alone tool for the diagnosis and management of concussion.

2. REMOVING THE PLAYER FROM THE GAME

- **Initial management must adhere to the first aid rules, including airway, breathing, circulation, and spinal immobilisation.**
- Any player with a suspected concussion must be removed from the game. (See section below for management of the unconscious player.)
- Due care of the neck/cervical spine must be given when removing any player after a head knock. Immobilisation of the neck in a cervical collar by a qualified first aid provider is required. A full range of child-sized and adult-sized collars should be available at every game.
- Removing the player from the game allows the first aid provider time and space to assess the player properly.
- **Any player who has suffered a concussion must not be allowed to return to play in the same game.** Do not be swayed by the opinion of the player, trainers, coaching staff, parents or others suggesting premature return to play.

3. REFERRING THE PLAYER TO A MEDICAL DOCTOR FOR ASSESSMENT

- Management of head injury is difficult for non-medical personnel. In the early stages of injury, it is often not clear whether you are dealing with a concussion or there is a more severe underlying structural head injury.
- For this reason, ALL players with concussion or a suspected concussion need an urgent medical assessment (with a registered medical doctor). This assessment can be provided by a medical doctor present at the venue, local general practice or hospital emergency department.
- If a doctor is not available at the venue, then the player should be sent to a local general practitioner or hospital emergency department.
- It is useful to have a list of local doctors and emergency departments in close proximity to the ground in which the game is being played. This resource can be determined at the start of each season (in discussion with the local medical services).
- A pre-game checklist should be printed and provided to trainers and other staff involved in the match-day care of players. The checklist should be kept with the Concussion Recognition Tool. The checklist should include contact details for:
 - a) **Local general practices;**
 - b) **Local hospital emergency departments**
 - c) **Ambulance services (000).**

The pre-game checklist can also be provided to trainers and medical staff of the away team, who are likely to be less familiar with local medical services.

MANAGEMENT OF AN UNCONSCIOUS PLAYER AND WHEN TO REFER TO HOSPITAL

- Basic first aid principles should be used when dealing with any unconscious player (i.e. Airway, Breathing, CPR...). Care must be taken with the player's neck, which may have also been injured in the collision.
- In unconscious players, the player must only be moved (onto the stretcher) by qualified health professionals, trained in spinal immobilization techniques. If no qualified health professional is on site, then do not move the player – await arrival of the ambulance. If the unconscious player is wearing a helmet, do not remove the helmet, unless trained to do so.
- Urgent hospital referral is necessary if there is any concern regarding the risk of a structural head or neck injury.
- **Urgent transfer to hospital is required if the player displays any of the following:**
 - a) Loss of consciousness or seizures**
 - b) Confusion**
 - c) Deterioration after their injury (e.g. increased drowsiness, headache or vomiting)**
 - d) Neck pain or spinal cord symptoms (e.g. player reports numbness, tingling, weakness in arms or legs)**
- Overall, if there is any doubt, the player should be referred to hospital.

B. Follow-up management

- A concussed player must not be allowed to return to school or return to play before having a medical clearance.
- Return to learning and school take precedence over return to sport.
- In every case, the decision regarding the timing of return to training should be made by a medical doctor with experience in managing concussion.
- In general, a more conservative approach (i.e. longer time to return to sport) is used in cases where there is any uncertainty about the player's recovery ("**if in doubt sit them out**").

RETURN TO PLAY

- Players should not return to play until they have returned to school/ learning without worsening of symptoms.
- Players should be returned to play in a graduated fashion.
- The "concussion rehabilitation" program should be supervised by the treating medical practitioner and should follow a step-wise symptom limited progression, for example:
 1. **Rest until symptoms recover (includes physical and mental rest)**
 2. **Light aerobic activity (e.g. walking, swimming or stationary cycling) – can be commenced 24-48 hours after symptoms have recovered**
 3. **Light, non-contact training drills (e.g. running, ball work)**
 4. **Non-contact training drills (i.e. progression to more complex training drills, may start light resistance training. Resistance training should only be added in the later stages)**
 5. **Full contact training – only after medical clearance**
 6. **Return to competition (game play)**
- There should be approximately 24 hours (or longer) for each stage.
- Players should be symptom-free during their rehabilitation program. If they develop symptoms at any stage, then they should drop back to the previously symptom-free level and try to progress again after a further 24 hour period of rest.
- If the player is symptomatic for more than 10 days, then review by a medical practitioner, expert in the management of concussion, is recommended.

The Management of Concussion in Children (players aged 5-17)

As part of the 2012 meeting, specific recommendations were made for the management of children. Children require a different approach from adults because their brains are developing, and they need to continue learning and acquiring knowledge. As such, the priority is not just player welfare and return to play, but a critical element is return to school and learning.

As well as all of the principles of management outlined above, the following advice must be followed in any instance of a child being concussed or suspected of concussion.

Concussion symptoms can cause problems with memory and information processing, which interferes with the child's ability to learn in the classroom. It is for this reason that a child is not to return to school until medically cleared to do so.

RETURN TO SCHOOL

- Concussion may impact on the child's cognitive ability to learn at school. This must be considered, and **medical clearance is required before the child may return to school.**
- **It is reasonable for a child to miss a day or two of school after concussion, but extended absence is uncommon.**
- In some children, a graduated return to school program will need to be developed for the child. Additional management by a paediatric neuropsychologist may assist in more difficult cases.
- Symptom assessment in the child often requires the addition of parent and/or teacher input
- The child will progress through the return to school program provided that there is no worsening of symptoms. If any particular activity worsens symptoms, the child will abstain from that activity until it no longer causes symptom worsening. Use of computers and internet should follow a similar graduated program, provided that it does not worsen symptoms. This program should include communication between the parents, teachers, and health professionals and will vary from child to child. The return to school program should consider:
 - Extra time to complete assignments and tests
 - Quiet room to complete assignments and tests
 - Avoidance of noisy areas such as cafeterias, assembly halls, sporting events, music classes
 - Frequent breaks during class, homework, tests

- No more than one exam per day
- Shorter assignments
- Repetition/memory cues
- Use of peer helper/tutor
- Reassurance from teachers that the student will be supported through recovery through accommodations, workload reduction, alternate forms of testing
- Later start times, half days, only certain classes
- **Children are not to return to play or sport until they have successfully returned to school/learning, without worsening of symptoms. Medical clearance should be given before return to play.**
- If there are any doubts, management should be referred to a qualified health practitioner, expert in the management of concussion in children.

RETURN TO PLAY

- Players should not return to play until they have returned to school/learning without worsening of symptoms.
- Players should be returned to play in a graduated fashion.
- The “concussion rehabilitation” program should be supervised by the treating medical practitioner and should follow a step-wise symptom limited progression, for example:
 1. **Rest until symptoms recover (includes physical and mental rest)**
 2. **Light aerobic activity (e.g. walking, swimming or stationary cycling) – can be commenced 24-48 hours after symptoms have recovered**
 3. **Light, non-contact training drills (e.g. running, ball work)**
 4. **Non-contact training drills (i.e. progression to more complex training drills, may start light resistance training. Resistance training should only be added in the later stages)**
 5. **Full contact training – only after medical clearance**
 6. **Return to competition (game play)**
- There should be approximately 24 hours (or longer) for each stage.
- Players should be symptom-free during their rehabilitation program. If they develop symptoms at any stage, then they should drop back to the previously symptom-free level and try to progress again after a further 24 hour period of rest.
- If the player is symptomatic for more than 10 days, then review by a medical practitioner, expert in the management of concussion, is recommended.

ROLE OF HELMETS AND MOUTHGUARDS IN AUSTRALIAN FOOTBALL

HELMETS

- There is no definitive scientific evidence that helmets prevent concussion or other brain injuries in Australian football.
- There is some evidence that younger players who wear a helmet may change their playing style, and receive more head impacts as a result. Accordingly, helmets are not recommended for the prevention of concussion.
- Helmets may have a role in the protection of players on return to play following specific injuries (e.g. face or skull fractures).

MOUTHGUARDS

- Mouthguards have a definite role in preventing injuries to the teeth and face and for this reason they are strongly recommended at all levels of football.
- Dentally fitted laminated mouthguards offer the best protection. 'Boil and bite' type mouthguards are not recommended for any level of play as they can dislodge during play and block the airway.
- There is no definitive scientific evidence that mouthguards prevent concussion or other brain injuries in Australian Football.

This document has been published by the AFL as a position statement on the role of helmets and mouthguards in Australian Football. It is based on advice provided by the AFL Concussion Working Group and AFL Medical Officers' Association.

– July, 2012

REFERENCES

1. McCrory, P et al. Consensus statement on concussion in sport – the 4th international conference on concussion in sport held in Zurich, November 2012. *BJSM*, 2013, Volume 47, issue 5.

Pocket CONCUSSION RECOGNITION TOOL

To help identify concussion in children, youth and adults



RECOGNIZE & REMOVE

Concussion should be suspected **if one or more** of the following visible clues, signs, symptoms or errors in memory questions are present.

1. Visible clues of suspected concussion

Any one or more of the following visual clues can indicate a possible concussion:

- Loss of consciousness or responsiveness
- Lying motionless on ground / Slow to get up
- Unsteady on feet / Balance problems or falling over / Incoordination
- Grabbing / Clutching of head
- Dazed, blank or vacant look
- Confused / Not aware of plays or events

2. Signs and symptoms of suspected concussion

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

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

3. Memory function

Failure to answer any of these questions correctly may suggest a concussion.

"What venue are we at today?"

"Who scored last in this game?"

"Did your team win the last game?"

"Which half is it now?"

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

Any athlete with a suspected concussion should be IMMEDIATELY REMOVED FROM PLAY, and should not be returned to activity until they are assessed medically. Athletes with a suspected concussion should not be left alone and should not drive a motor vehicle.

It is recommended that, in all cases of suspected concussion, the player is referred to a medical professional for diagnosis and guidance as well as return to play decisions, even if the symptoms resolve.

RED FLAGS

If ANY of the following are reported then the player should be safely and immediately removed from the field. If no qualified medical professional is available, consider transporting by ambulance for urgent medical assessment:

- ▶ Athlete complains of neck pain
- ▶ Severe or increasing headache
- ▶ Seizure or convulsion
- ▶ Deteriorating conscious state
- ▶ Repeated vomiting
- ▶ Double vision
- ▶ Increasing confusion or irritability
- ▶ Unusual behaviour change
- ▶ Weakness or tingling / burning in arms or legs

Remember:

- In all cases, the basic principles of first aid (danger, response, airway, breathing, circulation) should be followed.
- Do not attempt to move the player (other than required for airway support) unless trained to do so.
- Do not remove helmet (if present) unless trained to do so.

from McCrory et. al, Consensus Statement on Concussion in Sport. Br J Sports Med 47 (5), 2013

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CONCUSSION RECOGNITION & MANAGEMENT GUIDELINES FOR PLAYERS

Concussion is a mild brain injury, caused by trauma that results in temporary dysfunction of the brain. When it occurs a player may experience symptoms and temporary loss of brain skills such as memory and thinking abilities. It is important for players to be aware of possible signs of concussion which are often subtle.

The trauma causing concussion can sometimes be obvious, but at other times may be very subtle and hardly noticed. Ask teammates, coaches or others who were present whether they observed you unconscious, dazed or confused at the time of the incident if you have some symptoms or signs. If a player with concussion returns to sport whilst still symptomatic, there is an increased risk of further injury. Therefore, **no player who has concussion, or is suspected of having concussion, should return to their sporting activity (training or playing) until cleared by a doctor.**

Some of the possible symptoms of concussion:

- Headache
- Dizziness
- Fatigue
- Memory disturbance
- Nausea, vomiting and abdominal pain
- Altered or lost vision
- Ringing in the ears

Some of the signs you may observe:

- Loss of balance
- Pale complexion
- Slow or altered verbal skills
- Mental confusion and memory loss
- Irritability
- Poor concentration
- Inappropriate behaviour

You might think that you are just not feeling your usual self! Think of concussion.

- If you observe any of these symptoms or signs **see a doctor as soon as possible.**
- If you observe deterioration in these symptoms or signs **go immediately to an accident and emergency department at your nearest hospital.**

Progression and Management

As a temporary brain dysfunction, concussion will resolve with time. This may vary from an hour or so to several days. Occasionally the brain will recover even more slowly.

The best treatment is rest from physical activity and work/study. The player should be seen by a doctor who will monitor the symptoms, signs and brain functioning. **The doctor must clear the player to return to sporting activity** and this will usually involve a stepped approach with a gradual increase in activities over a few days.

The doctor may arrange a specialist opinion (if the concussion is slow to resolve) or cognitive testing (brain functioning).

If at any stage the symptoms or signs are getting worse seek **urgent medical attention.**

Key Messages

- 1. Concussion is a temporary dysfunction of the brain following trauma**
- 2. Suspect concussion if you are irritable, sick, excessively fatigued, have a headache, or just not feeling your usual self**
- 3. Seek medical attention – urgently if the symptoms or signs are getting worse**
- 4. Rest is the best treatment followed by a gradual return to physical activity and work/study**

For more detailed information refer to the AFL brochure *Management of Concussion in Australian Football* and the *Coaches/Injury Management* section of the AFL's Community Development website www.aflcommunityclub.com.au.



CONCUSSION RECOGNITION & MANAGEMENT GUIDELINES FOR PARENTS

Concussion is a mild brain injury, caused by trauma that results in temporary dysfunction of the brain. When it occurs a child may experience symptoms and temporary loss of brain skills such as memory and thinking abilities. It is important for parents of young athletes to be aware of possible signs of concussion which are often subtle.

The trauma causing concussion can sometimes be obvious, but at other times may be very subtle and hardly noticed. Ask your child or an adult who were present whether they were unconscious, dazed or confused at the time of the incident if they have some symptoms or signs. If a child with concussion returns to sport whilst still symptomatic, there is an increased risk of further injury to the child. Therefore, **no player who has concussion, or is suspected of having concussion, should return to their sporting activity (training or playing) until cleared by a doctor.**

Some of the possible symptoms of concussion:

- Headache
- Dizziness
- Fatigue
- Memory disturbance
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Progression and Management

As a temporary brain dysfunction, concussion will resolve with time. This may vary from an hour or so to several days. Occasionally the brain will recover even more slowly.

The best treatment is rest from physical activity and school. The child should be seen by a doctor who will monitor the symptoms, signs and brain functioning. The doctor will determine when the child may return to school. The child must not return to sport until after a successful return to school and learning. **The doctor must clear the child to return to sporting activity** and this will usually involve a stepped approach with a gradual increase in activities over a few days.

The doctor may arrange a specialist opinion (if the concussion is slow to resolve) or cognitive testing (brain functioning).

If at any stage the symptoms or signs are getting worse **seek urgent medical attention.**

Key Messages

- 1. Concussion is a temporary dysfunction of the brain following trauma**
- 2. Suspect concussion if your child is irritable, complains of a headache, is sick, extensively fatigued or just not themselves**
- 3. Seek medical attention – urgently if the symptoms or signs are getting worse**
- 4. Rest is the best treatment followed by a return to school, before a gradual return to physical activity**

For more detailed information refer to the AFL brochure *Management of Concussion in Australian Football* and the *Coaches/Injury Management* section of the AFL's Community Development website www.aflcommunityclub.com.au.

