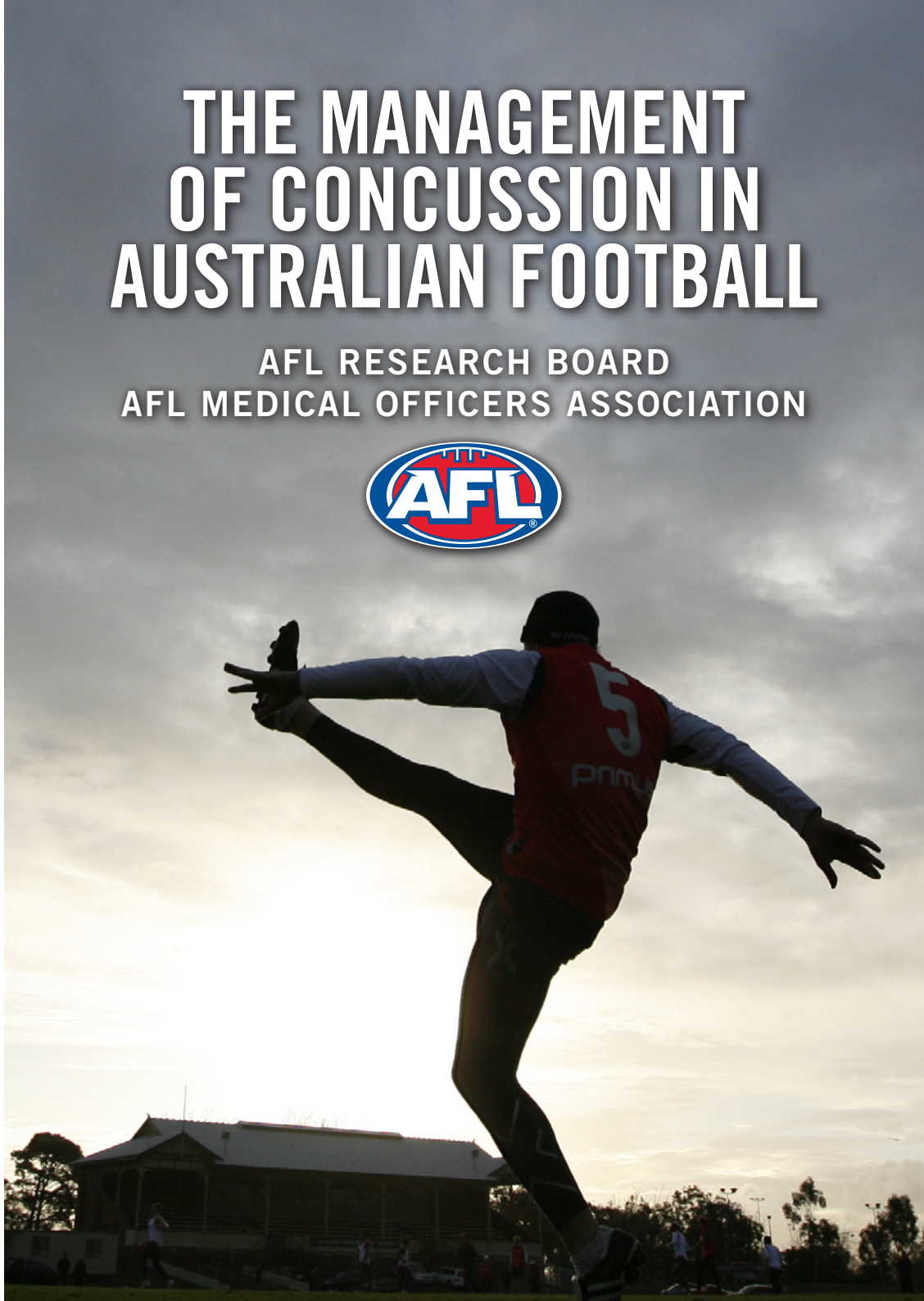
Notes

THE MANAGEMENT OF CONCUSSION IN AUSTRALIAN FOOTBALL

AFL RESEARCH BOARD
AFL MEDICAL OFFICERS ASSOCIATION



THE MANAGEMENT OF CONCUSSION IN AUSTRALIAN FOOTBALL

This document has been produced by the AFL following an AFL Research Board project, carried out by Dr Michael Makdissi, and endorsed by the AFL Medical Officers' Association as a Position Statement on the Management of Concussion in Australian Football.

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.

August, 2008

THE MANAGEMENT OF CONCUSSION IN AUSTRALIAN FOOTBALL

AFL Medical Officers Association Position Statement

Summary

- Concussion refers to a disturbance in brain function caused by trauma.
- Complications can occur if the player is returned to play before having fully recovered from injury.
- **The key components of management include:**
  - **a) Suspecting the diagnosis in any player with symptoms such as confusion or headache after a knock to the head;**
  - **b) Referring the player for medical evaluation; and**
  - **c) Ensuring that the player has received medical clearance before allowing a return to play or a graded training program.**
- The cornerstones of medical management include rest until symptoms have resolved; cognitive testing to ensure recovery of brain function, and then a graded return to sport program with monitoring for recurrence of symptoms.
- 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")***.
- Difficult cases, such as those involving prolonged symptoms or deficits in brain function, require a more detailed, multi-disciplinary approach to management.

A player with suspected concussion must be withdrawn from playing or training until medically evaluated and cleared.

Background

Concussion is a relatively common injury in Australian Football. It reflects a disturbance in brain function caused by trauma, rather than a structural injury. Resulting symptoms and changes in brain function are temporary and recover spontaneously. The recovery process however, is variable from person to person and injury to injury and may take from just a few minutes through to several weeks.

Symptoms of concussion typically include headache, blurred vision, dizziness and nausea. Brain function is also affected. Changes include confusion, memory loss and reduced ability to think clearly, concentrate and process information. These deficits can impair the way a player reacts during competition, which may put player at risk of further head or musculoskeletal injury. Repeated head injury, particularly when the player has not yet fully recovered from a previous head injury, has been linked with a number of potential complications, such as prolonged symptoms and long-term deterioration of brain function. Therefore, it is important to make the diagnosis and manage the condition appropriately. This means keeping the player out of training and competition until fully recovered.

This document approved by the AFL Medical Officers' Association summarises the specific management guidelines developed for care of Australian Football players following a concussive injury.

Overall, these guidelines should serve only as a general guide for the management of concussive injuries sustained in Australian Football based on the most up-to-date evidence available. Treatment of individual players will be determined by the experience of the examining practitioner, the specific clinical circumstances presented and the resources available for assessment and testing.

Management guidelines

Game-day evaluation and treatment

The key components of initial management involve making an accurate diagnosis and careful monitoring of the injured player.

1. On-field

- Loss of consciousness (LOC), confusion, and memory disturbance are classic features of concussive injuries, but these are not present in every case of concussion.
- Other symptoms that should raise suspicion of a concussive injury include: headache, blurred vision, balance problems, dizziness, feeling "dinged" or "dazed", a player saying "I don't feel right", drowsiness, fatigue, difficulty concentrating or difficulty remembering.
- Any player with a suspected concussive injury must be removed from the field of play for further evaluation.
- The diagnosis can be confirmed using sideline mental status assessment tools, such as the Sideline Concussion Assessment Tool (SCAT).
- Basic first-aid principles apply when dealing with any unconscious player (i.e. airways, breathing, circulation). Care must be taken with the player's cervical spine, which may have also been injured in the collision.

2. Sideline evaluation

- Regular reassessment of symptoms and brain function in the hours following injury is essential to monitor for deterioration. This helps differentiate concussion (improvement) from structural head injuries (deterioration).
- Indications for referral to hospital are listed in Table 1.

Table 1. Indications for referral to hospital

➤ Deterioration of conscious state post-injury (e.g. increased drowsiness).
➤ Focal neurological signs (e.g. numbness or weakness in the arms or legs).
➤ Prolonged confusion (for more than 30 minutes) or loss of consciousness for more than one minute.
➤ Persistent vomiting or increasing headache post-injury.
➤ Where there is difficulty with assessment or uncertain follow-up
➤ Children (under 18) with head injuries.
➤ High-risk patients (e.g. haemophilia, use of blood thinners).

- Overall, if there is any doubt, the patient should be referred to hospital.
- If the player is being discharged home, clear and practical instructions, particularly regarding abstinence from alcohol and driving, medication use, physical exertion and medical follow up, should be given to the player and relevant caregivers (e.g. parents, partner, etc).
- Tools such as the SCAT facilitate regular re-assessment of concussed players and provide simple and practical advice for patient education (see attachment). It is important to note that abbreviated sideline evaluation tools are designed for rapid concussion evaluation. They are not meant to replace a more comprehensive cognitive assessment and should not be used as a stand-alone tool for the ongoing management of concussive injuries.

3. Follow-up

- **Any player who has suffered from a concussive injury must be referred for medical evaluation and clearance before being allowed to return to training.**

Return-to-play decisions

The basic principle of return-to-play decisions following concussive injury is to ensure that the player has fully recovered before being allowed to return to competition. In practical terms, this means resting the player until symptoms have resolved, then performing an objective test to assess recovery of brain function, followed by a graded return to play with monitoring for recurrence of symptoms ("concussion rehabilitation").

- In every case, decisions regarding the timing of return to training should be made by a medical doctor with experience in concussive injuries. Do not be swayed by the opinion of players, coaching staff or others suggesting premature return to play.
- Cognitive tests can be used to assess recovery of brain function. These tests should be performed after symptoms have resolved. The important aspects of this testing involve comparing the post-concussion results to the players' own pre-injury baseline and using a test that is sensitive to the effects of concussion. Ideally, computerised test platforms should be used, however, paper-and-pencil tests such as the Digit Symbol Substitution Test (with a more conservative return-to-play approach) are useful in cases where costs and time restrictions limit the use of computerised testing. Overall, it is important to remember that cognitive testing is only one component of assessment, and therefore should not be the sole basis of management decisions.
- 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 on the day of injury

- In general, **the safest course of action is that the player not be allowed to return to play in the game or training session.**

Concussion rehabilitation

- Following a concussive injury players should be returned to play in a graded fashion (see Table 2).

Table 2. Concussion rehabilitation
Early rest (do nothing!).
Graduated return to activity (to commence 24-48 hours after resolution of symptoms).
1. Light aerobic exercise e.g. stationary bike.
2. Running.
3. Non-contact training drills.
4. Full contact training.
5. Game play.

- If symptoms recur at any stage of the "concussion rehab", the player should be re-evaluated by their treating doctor.

Complex concussions

- "Complex concussions" are cases in which symptoms or changes in brain function persist for more than 10 days, where the player has suffered multiple concussions over time or where the player has sustained a significant injury in response to a minor blow.
- These cases are best managed in a multi-disciplinary manner by doctors with specific expertise in concussive injuries.

The Scat Card

This tool represents a standardized method of evaluating people after concussion in sport. This Tool has been produced as part of the Summary and Agreement Statement of the Second International Symposium on Concussion in Sport, Prague 2004

Sports concussion is defined as a complex pathophysiological process affecting the brain, induced by traumatic biomechanical forces. Several common features that incorporate clinical, pathological and biomechanical injury constructs that may be utilized in defining the nature of a concussive head injury include:

1. 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.
2. Concussion typically results in the rapid onset of short-lived impairment of neurological function that resolves spontaneously.
3. Concussion may result in neuropathological changes but the acute clinical symptoms largely reflect a functional disturbance rather than structural injury.
4. Concussion results in a graded set of clinical syndromes that may or may not involve loss of consciousness. Resolution of the clinical and cognitive symptoms typically follows a sequential course.
5. Concussion is typically associated with grossly normal structural neuroimaging studies.

Post Concussion Symptoms

Ask the athlete to score themselves based on how they feel now. It is recognized that a low score may be normal for some athletes, but clinical judgment should be exercised to determine if a change in symptoms has occurred following the suspected concussion event.

It should be recognized that the reporting of symptoms may not be entirely reliable. This may be due to the effects of a concussion or because the athlete's passionate desire to return to competition outweighs their natural inclination to give an honest response.

If possible, ask someone who knows the athlete well about changes in affect, personality, behavior, etc.

Remember, concussion should be suspected in the presence of ANY ONE or more of the following:

- Symptoms (such as headache), or
- Signs (such as loss of consciousness), or
- Memory problems

Any athlete with a suspected concussion should be monitored for deterioration (i.e., should not be left alone) and should not drive a motor vehicle.

For more information see the "Summary and Agreement Statement of the Second International Symposium on Concussion in Sport" in the April, 2005 edition of the Clinical Journal of Sport Medicine (vol 15), British Journal of Sports Medicine (vol 39), Neurosurgery (vol 59) and the Physician and Sportsmedicine (vol 33). This tool may be copied for distribution to teams, groups and organizations.

The SCAT Card

(Sport Concussion Assessment Tool)

Athlete Information

What is a concussion? A concussion is a disturbance in the function of the brain caused by a direct or indirect force to the head. It results in a variety of symptoms (like those listed below) and may, or may not, involve memory problems or loss of consciousness.

How do you feel? You should score yourself on the following symptoms, based on how you feel now.

Post Concussion Symptom Scale

	None		Moderate			Severe	
Headache	0	1	2	3	4	5	6
"Pressure in head"	0	1	2	3	4	5	6
Neck Pain	0	1	2	3	4	5	6
Balance problems or dizzy	0	1	2	3	4	5	6
Nausea or vomiting	0	1	2	3	4	5	6
Vision problems	0	1	2	3	4	5	6
Hearing problems / ringing	0	1	2	3	4	5	6
"Don't feel right"	0	1	2	3	4	5	6
Feeling "dinged" or "dazed"	0	1	2	3	4	5	6
Confusion	0	1	2	3	4	5	6
Feeling slowed down	0	1	2	3	4	5	6
Feeling like "in a fog"	0	1	2	3	4	5	6
Drowsiness	0	1	2	3	4	5	6
Fatigue or low energy	0	1	2	3	4	5	6
More emotional than usual	0	1	2	3	4	5	6
Irritability	0	1	2	3	4	5	6
Difficulty concentrating	0	1	2	3	4	5	6
Difficulty remembering	0	1	2	3	4	5	6

(follow up symptoms only)

Sadness	0	1	2	3	4	5	6
Nervous or Anxious	0	1	2	3	4	5	6
Trouble falling asleep	0	1	2	3	4	5	6
Sleeping more than usual	0	1	2	3	4	5	6
Sensitivity to light	0	1	2	3	4	5	6
Sensitivity to noise	0	1	2	3	4	5	6
Other: _____	0	1	2	3	4	5	6

What should I do?

Any athlete suspected of having a concussion should be removed from play, and then seek medical evaluation.

Signs to watch for:

Problems could arise over the first 24-48 hours. You should not be left alone and must go to a hospital at once if you:

- Have a headache that gets worse
- Are very drowsy or can't be awakened (woken up)
- Can't recognize people or places
- Have repeated vomiting
- Behave unusually or seem confused; are very irritable
- Have seizures (arms and legs jerk uncontrollably)
- Have weak or numb arms or legs
- Are unsteady on your feet; have slurred speech

Remember, it is better to be safe. **Consult your doctor after a suspected concussion.**

What can I expect?

Concussion typically results in the rapid onset of short-lived impairment that resolves spontaneously over time. You can expect that you will be told to rest until you are fully recovered (that means resting your body and your mind). Then, your doctor will likely advise that you go through a gradual increase in exercise over several days (or longer) before returning to sport.

The SCAT Card

(Sport Concussion Assessment Tool)

Medical Evaluation

Name: _____ Date _____

Sport/Team: _____ Mouth guard? Y N

1) SIGNS

Was there loss of consciousness or unresponsiveness? Y N
Was there seizure or convulsive activity? Y N
Was there a balance problem / unsteadiness? Y N

2) MEMORY

Modified Maddocks questions (check correct)

At what venue are we? __; Which half is it? __; Who scored last?__

What team did we play last? __; Did we win last game? __?

3) SYMPTOM SCORE

Total number of positive symptoms (from reverse side of the card) = _____

4) COGNITIVE ASSESSMENT

5 word recall	(Examples)	Immediate	Delayed (after concentration tasks)
Word 1 _____	cat	___	___
Word 2_____	pen	___	___
Word 3 _____	shoe	___	___
Word 4 _____	book	___	___
Word 5 _____	car	___	___

Months in reverse order:
Jun-May-Apr-Mar-Feb-Jan-Dec-Nov-Oct-Sep-Aug-Jul (circle incorrect)

or

Digits backwards (check correct)

5-2-8	3-9-1	_____
6-2-9-4	4-3-7-1	_____
8-3-2-7-9	1-4-9-3-6	_____
7-3-9-1-4-2	5-1-8-4-6-8	_____

Ask delayed 5-word recall now

5) NEUROLOGIC SCREENING

	Pass	Fail
Speech	___	___
Eye Motion and Pupils	___	___
Pronator Drift	___	___
Gait Assessment	___	___

Any neurologic screening abnormality necessitates formal neurologic or hospital assessment

6) RETURN TO PLAY

Athletes should not be returned to play the same day of injury.
When returning athletes to play, they should follow a stepwise symptom-limited program, with stages of progression. For example:

1. rest until asymptomatic (physical and mental rest)
2. light aerobic exercise (e.g. stationary cycle)
3. sport-specific exercise
4. non-contact training drills (start light resistance training)
5. full contact training after medical clearance
6. return to competition (game play)

There should be approximately 24 hours (or longer) for each stage and the athlete should return to stage 1 if symptoms recur. Resistance training should only be added in the later stages.
Medical clearance should be given before return to play.

Instructions:
This side of the card is for the use of medical doctors, physiotherapists or athletic therapists. In order to maximize the information gathered from the card, it is strongly suggested that all athletes participating in contact sports complete a baseline evaluation prior to the beginning of their competitive season. This card is a suggested guide only for sports concussion and is not meant to assess more severe forms of brain injury. **Please give a COPY of this card to the athlete for their information and to guide follow-up assessment.**

Signs:
Assess for each of these items and circle Y (yes) or N (no).

Memory: If needed, questions can be modified to make them specific to the sport (e.g. "period" versus "half")

Cognitive Assessment:
Select any 5 words (an example is given). Avoid choosing related words such as "dark" and "moon" which can be recalled by means of word association. Read each word at a rate of one word per second. The athlete should not be informed of the delayed testing of memory (to be done after the reverse months and/or digits). Choose a different set of words each time you perform a follow-up exam with the same candidate.

Ask the athlete to recite the months of the year in reverse order, starting with a random month. Do not start with December or January. Circle any months not recited in the correct sequence.

For digits backwards, if correct, go to the next string length. If incorrect, read trial 2. Stop after incorrect on both trials.

Neurologic Screening:
Trained medical personnel must administer this examination. These individuals might include medical doctors, physiotherapists or athletic therapists. Speech should be assessed for fluency and lack of slurring. Eye motion should reveal no diplopia in any of the 4 planes of movement (vertical, horizontal and both diagonal planes). The pronator drift is performed by asking the patient to hold both arms in front of them, palms up, with eyes closed. A positive test is pronating the forearm, dropping the arm, or drift away from midline. For gait assessment, ask the patient to walk away from you, turn and walk back.

Return to Play:
A structured, graded exertion protocol should be developed; individualized on the basis of sport, age and the concussion history of the athlete. Exercise or training should be commenced only after the athlete is clearly asymptomatic with physical and cognitive rest. Final decision for clearance to return to competition should ideally be made by a medical doctor.

For more information see the "Summary and Agreement Statement of the Second International Symposium on Concussion in Sport" in the April, 2005 Clinical Journal of Sport Medicine (vol 15), British Journal of Sports Medicine (vol 39), Neurosurgery (vol 59) and the Physician and Sportsmedicine (vol 33).