AFL GUIDELINES FOR THE MANAGEMENT OF CONCUSSION AT AFL LEVEL
Developed by the AFL Medical Officers Association (AFLMOA) and issued by the AFL as a guideline under AFL Player Rule 26.1 ('Medically Unfit Players').

Version: March, 2013 for Round 1 of the 2013 Premiership Season.

SUMMARY

1. In considering the best practice management of concussion, the priority remains the welfare of the player, both in the short and long term.
2. Following the Fourth International Conference on Concussion in Sport (Zurich, 2012) the AFL Medical Officers' Association (AFLMOA) Concussion Guidelines have been enhanced.
3. For practical purposes, a player with any neurological symptoms or signs, video features of concussion and/or any evidence of a disturbance of mental state or cognitive function following trauma, can be considered to have concussion. In such circumstances, consideration must also be given to excluding an underlying structural brain injury.
4. Where there is any suspicion of concussion, the player requires further evaluation including video footage review and assessment of symptoms, orientation, balance and cognitive function (SCAT3) prior to a final determination.
5. Any player with a medically diagnosed concussion will not be allowed to return to play on the day of injury.
6. If a player is cleared of a concussion following assessment, they can be allowed to return to play, but should be monitored for the duration of the game as concussion symptoms are dynamic and can evolve over time.
7. In following the guidelines, the diagnosis of concussion and subsequent return to play remains an individual decision by the team doctor guided by the principles set forth in this document, good clinical judgment and the information available to the team doctor at the time of the player's assessment.
8. Club Medical Officers may be required to provide full documentation of clinical assessments of concussion to the AFL Medical Directors for review. Full documentation will also be collected as part of ongoing research activities.

BACKGROUND

- Concussion is an important medical issue in contact and collision sports worldwide.
- The Fourth International Conference on Concussion in Sport was held in Zurich in November 2012. The main objective of the conference was to build on principles developed in the previous conferences and further develop the conceptual understanding of concussion using a formal consensus- and evidence-based approach.
- The Australian Football League, AFLMOA and AFL Players Association were well represented at the conference (on the scientific panel, as invited speakers and amongst the delegates).
- Key new concepts that arose from the Zurich conference included:
  (a) A focus on improved recognition of concussion (e.g. video replays, etc);
  (b) An emphasis on a conservative management approach particularly given the inherent unreliability of the sideline assessment and the fact that concussion is an evolving injury in the early minutes following head impact;
  (c) Unanimous agreement of no return to play or training on the day of injury;
  (d) The importance of balance and postural stability assessment;
  (e) Modification of the management process with regard to exercise and symptom-limited activity;
  (f) Highlighting the importance of sequelae such as depression and mental health issues and discussion about the potential risk of long term complications.
- The AFLMOA has reviewed and further refined their approach to the assessment and management of concussion based on the recommendations from the Zurich conference and their experience with the 2011 AFLMOA concussion guidelines and reflects a pragmatic translation of the consensus statement for the management of concussion in Australian Football.
- In following the guidelines, the diagnosis of concussion and subsequent return to play remains an individual decision by the team doctor guided by the principles set forth in this document, good clinical judgment and the information available to the team doctor at the time of the player's assessment.
- In considering the best practice management of concussion, the priority remains the welfare of the player, both in the short and long term.

PURPOSE

1. To protect the welfare of all players
2. To provide current best practice guidelines for the diagnosis and management of concussion in the AFL.

DEFINITION OF CONCUSSION

- Concussion is defined as a "*complex pathophysiological process affecting the brain, induced by biomechanical forces*".[1] It is characterized by a graded set of neurological symptoms and signs that typically come on rapidly and resolve spontaneously over a sequential course. It does not involve a structural injury to the brain however a complex short lived physiological disturbance occurs which in turn results in the clinical features of the condition.

- Diagnosis of concussion in the acute setting can be difficult because:
  a) Clinical symptoms and signs can change rapidly and may evolve over time;
  b) Many of the clinical features are not specific to concussion;
  c) There is no test or marker that can be relied on for an immediate diagnosis, particularly on the sideline; and
  d) Structural brain injury (e.g. contusion) can present with identical symptoms and clinical features and cannot be ruled out on the sideline.

  Consequently, the diagnosis of concussion remains a clinical decision based on assessment of a range of domains including symptoms (e.g. headache, difficulty concentrating, feeling like in a fog, emotional lability, etc); signs (e.g. loss of consciousness (LOC), balance disturbance); cognitive impairment (e.g. confusion, slowed reaction times); and neurobehavioural changes (e.g. irritability, not quite right).

- For practical purposes, a player with any neurological symptoms or signs, video features of concussion and/or any evidence of a disturbance of mental status or cognitive function following trauma, can be considered to have concussion. In such circumstances, consideration must also be given to excluding an underlying structural brain injury.

MANAGEMENT

A. Day of injury

- Any player who suffers a medically diagnosed concussion will NOT be allowed to return to game play or training on the day of their injury. AFL Player Rule 26 covers the obligations of clubs and medical staff with regard to player medical fitness, as the sole person responsible for medical decision making.

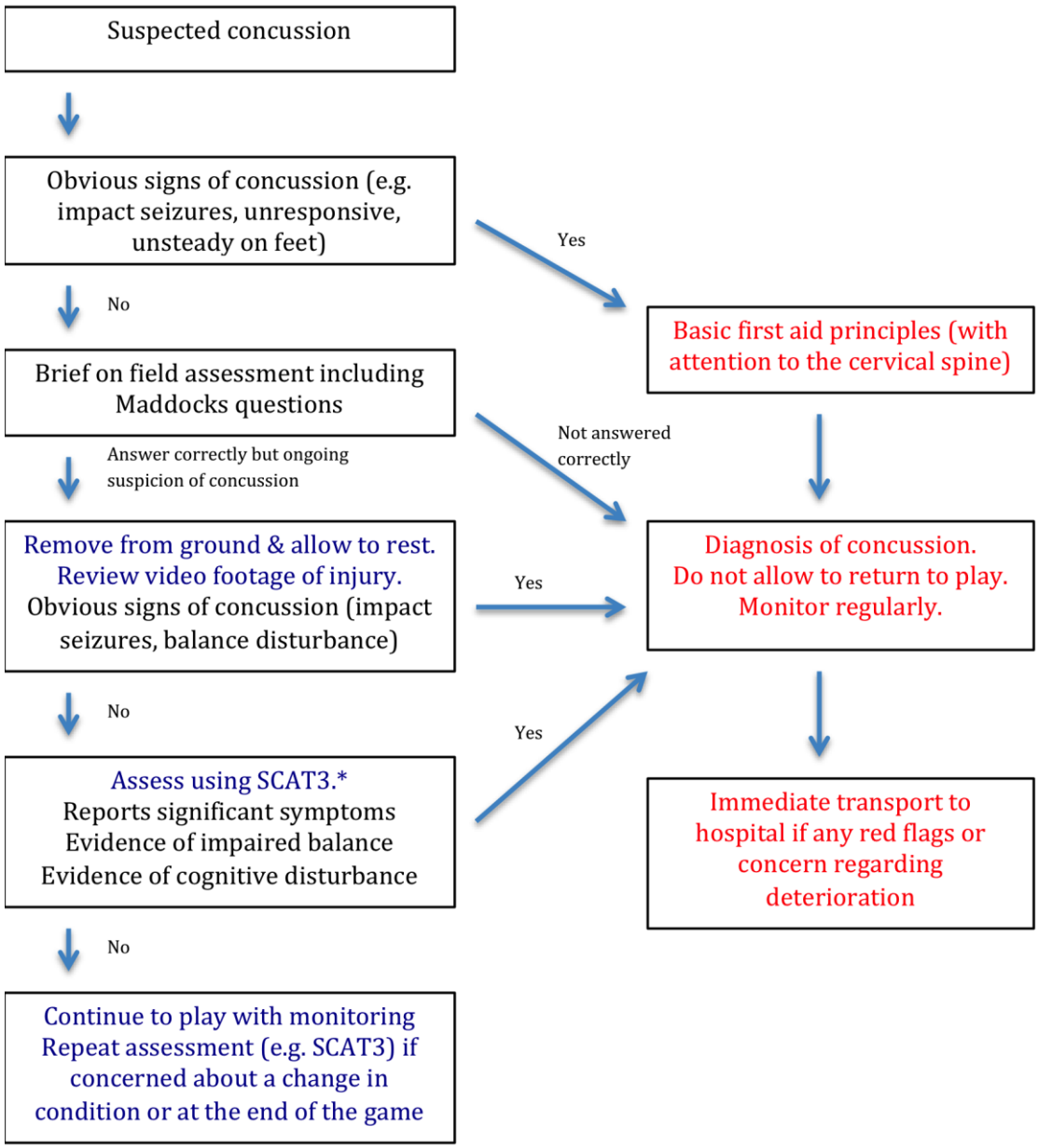
<u>Identification of concussion</u>

- Clinical features consistent with a diagnosis of concussion include any one or more of the following:
    - Obvious LOC (e.g. rag doll appearance on video review or unresponsive when being assessed);
    - Impact seizures (e.g. tonic posturing, tonic-clonic jerks, etc.);
    - Confusion/disorientation (e.g. fails the Maddocks questions);
    - Balance disturbance (e.g. unsteady gait observed at the time of injury or evidence of a balance disturbance on further assessment);
    - Memory disturbance or other cognitive deficits;
    - Presence of symptoms after head trauma;[*]
    - Any clinical impression by the team doctor that the player is not quite right following trauma.

[*] Symptoms should be interpreted according to the clinical presentation of the player. It is important to note that symptoms can be due to other diagnoses e.g. post-traumatic migraine, neck injury, eye injury, etc.

On field management of concussion

The on field management of concussion is summarized in Figure 1.



*If the team doctor still has a clinical suspicion that the player is not quite right regardless of the results of the SCAT3 assessment, then the player should be managed as having a concussion (i.e. if in doubt sit them out).

Figure 1 – Overview of on-field management of concussion in AFL

Where there is a clear diagnosis of concussion

- The player should be medically evaluated using standard emergency management principles and particular attention should be given to excluding a cervical spine injury.
- The player must not to be returned to play (or training) on the day of injury.
- The player must be monitored regularly for signs of deterioration or other warning signs of a potential underlying structural brain injury. The SCAT3 provides a useful assessment and monitoring tool and should be done at a convenient time following the injury (e.g. major break or after the game).
- If the player is suspected to have a structural brain injury then this requires immediate ambulance transport to a hospital with a neurosurgical unit.

Where there is a clinical suspicion of concussion but no clear on-field diagnosis

- The player should be removed from the field and must be assessed in a quiet environment, free from potential distracting influences.
- The player should be allowed to rest for 10 minutes while the treating doctor reviews the video footage of the injury where available (paying particular attention to signs of concussion such as impact seizures or balance disturbance).
- The player should then be assessed using the full SCAT3.
- If the diagnosis of concussion is confirmed following assessment, then the player should not be returned to play on the day.
- If the player is cleared of a diagnosis of concussion following assessment, then they may be allowed to return to play however it is critical to note that symptoms of concussion are dynamic and may evolve over time. Consequently, any player suspected of having a concussion should be monitored to assess for delayed symptom onset. The player should be reassessed during the game if there is any suspicion that their condition has changed (e.g. using the SCAT3). In addition, all players with a suspected concussion or removed using the concussion substitution rule during the game must complete a SCAT3 assessment at the end of the game.
- Although trainers and other staff may be asked to assist in monitoring a player on the field, it ultimately remains the team doctor's medico-legal responsibility to oversee this process and determine the player's fitness to play.
- Full contemporaneous clinical notes must be maintained (and will form part of an ongoing audit +/- review process).

Use of video to assist with decision-making

- Sideline video review can be a useful component of clinical assessment as it allows direct observation of the mechanism of injury and identification of acute signs of concussion, such as impact seizures, LOC or balance disturbance that may not be obvious from the bench.
- The AFL provides a network between the Coaches Box and bench at all major venues. This link enables the club to transmit vision using real time video feeds provided by the venue.
- Where a feed of vision is provided by the venue, Clubs are required by the AFL to provide access to this vision for medical staff on the bench and/or in the change rooms. Due to the use of different video analysis systems and configurations by each Club, it is the responsibility of the Club to ensure that the Team Medical Officers' requirements are met.
- AFL Match Managers will monitor the provision of video vision to the bench, and any problems experienced with the provision of suitable video feeds should be reported to the AFL Match Manager or AFL Ground Operations staff.

Temporary activation of substitute player for concussion assessment

- Clubs are permitted to activate their substitute player for a concussion assessment period of 20 minutes, after which time they are required to decide whether to put the player back onto the field, or sub them out of the game.
- Temporary activation of the substitute proposal is only permitted for concussion, and clubs are required to submit their assessment documentation to the AFL Medical Directors on the Monday following the match.
- Further details relating to the activation of the substitute for concussion assessment can be found in the 'Guidelines for temporary activation of sub for concussion assessment' located in the Appendix.

B. Decisions regarding return to play

- Decisions regarding return to play following concussion rely on a multifaceted clinical approach.
- In accordance with current consensus guidelines, there is no mandatory period of time that a player must be withheld from play following a concussion; the duration of exclusion from play is based on individualised assessment of recovery. The minimum

standard is that a player must be symptom free at rest and with exertion, and determined to have returned to baseline level of cognitive performance.

- Screening computerised cognitive tests provide a practical method for the assessment of cognitive recovery. A number of screening computerised cognitive test batteries have been validated for use following concussion in sport and are readily available (e.g. CogState Sport or ImPACT).
- Overall, it is important to remember that neuropsychological testing is only one component of assessment, and therefore should not be the sole basis of management decisions. Neuropsychological testing does not replace the need for a full history and clinical/neurological examination.
- The final determination regarding concussion diagnosis and/or fitness to play is a medical decision based on clinical judgment. The team doctor is in best position to make this clinical decision as they have considerable experience in the assessment and management of sports-related concussions, and have a detailed knowledge of the player, which can assist with identification of subtle behavioural changes that may accompany a concussion.

Role of investigations

- Conventional imaging (e.g. CT or MRI) should be considered in cases where there is concern regarding an underlying structural injury.
- Advanced imaging and investigation techniques (such as Diffusion Tensor Imaging, functional MRI, Magnetic Resonance Spectroscopy, quantitative EEG, etc.) have demonstrated changes in brain function, activation patterns and white matter fibre tracts in some studies of concussion in sport. The clinical significance of these changes however remains unclear. At present, the current literature does not support the use of these investigation tools in the routine clinical management of concussion. Advanced imaging and investigation techniques do however contribute to our understanding of the pathophysiology of concussion and ongoing use should be encouraged in the research setting.

Management of difficult or complicated cases

- Difficult or complicated cases (e.g. prolonged recovery or recurrent concussion) should be managed in a multi-disciplinary manner.

- In any case, the team doctor may choose to involve an independent clinician with an expertise in concussion, to assist in management decisions.

CONCUSSION RESEARCH IN AUSTRALIAN FOOTBALL

- Research on concussion has been conducted in the VFL/AFL since 1985. The studies performed in Australian Football have helped form the basis of international management guidelines including the Zurch 2013 guidelines. The AFL also has a Concussion Working Group that oversees rule changes, policy advice, research and guidelines in this area and has wide representation from a range of stakeholders.
- The AFL has a comprehensive injury surveillence system which is the world's longest running publicly released injury survey in sport. The survey has run for 21 seasons, achieving 100% participation and compliance over the last 16 seasons, and it has led directly and indirectly to dozens of published studies and interventions which have improved the safety of the AFL competition.
- Over the past decade, the AFL has instituted a number of rule and policy changes to reduce concussion and improve the management of this condition.
- Many of these projects have been supported by the AFL Research Board.
- Research conducted in AFL to date has:
    a) Lead to the development of tools to facilitate a diagnosis of concussion (Maddocks questions, SCAT3) and assist assessment of recovery following concussive injury (DSST, CogState Sport);
    b) Provided information on the normal patterns of recovery following concussive injury and helped identify factors that may be associated with more severe injury;
    c) Assessed the safety of current return to play management strategies by AFL doctors (including performance, injury rates and risk of repeat concussion);
    d) Examined novel neuroimaging, biomarkers and electrophysiological techniques to measure recovery from concussion.

A comprehensive research program on concussion in AFL is also currently being undertaken. Projects that have either commenced or are in the planning stages include:

1. Concussion audit (review of the epidemiology of all concussive injuries in AFL, including identification of risk factors for injury and assessment of biomechanical forces of impact).

2. Advanced neuroimaging techniques for the assessment of recovery following concussion.
3. Monitoring of long term outcomes of concussion on cognitive and mental health.
4. Translation and uptake of guidelines at a community level – implications for guideline implementation.

CONCUSSION PREVENTION & MINIMISATION OF LONG TERM COMPLICATIONS

- Concussion has continued to receive significant attention in the past decade both through the media and scientific community. Much of the recent interest has related to an association with recurrent head trauma and potential long-term complications such as depression and Chronic Traumatic Encephalopathy (CTE). Currently however the specifics of the relationship between head trauma and possible long-term complications following concussion as well as the influence of other risk factors such as genetics remain unclear. Until these relationships are established, it is prudent to maintain a conservative approach regarding the management of concussion.
- The focus of the current concussion guidelines is to minimise the risk to the athlete both in short and long term and to enhance concussion management.
- All key stakeholders have a responsibility for the prevention of concussion and minimisation of the risk of potential long-term complications. These groups and responsibilities include:
    - Team doctors - ensuring compliance with the current best practice guidelines;
    - Players - identifying and reporting their symptoms so that they can be managed appropriately and playing within the laws of the game to protect fellow players;
    - Coaches – assisting with compliance of best practice guidelines, and respecting the independent role of the team doctor in managing concussion;
    - Umpires – enforcing the laws of the game, maintaining awareness of possible signs of concussion, and facilitating the role of the team doctor in the on-field management of concussion where required;
    - Sports governing body (AFL) – developing an environment that encourages an understanding of the importance of concussion management, implementing laws of the game that assist with prevention of concussion, development and distribution of concussion guidelines, and facilitating concussion audit and research to improve the guidelines in the long term.

- Education and ongoing research programs should form the cornerstone of concussion prevention programs.

APPENDICES

- SCAT3
- Guidelines for temporary activation of sub for concussion assessment
- childSCAT3
- Community Guidelines
- Community GP Guidelines

REFERENCES

1. McCrory P, Meeuwisse W, Aubry M et al. Consensus Statement on Concussion in Sport: the 4th International Conference on Concussion in Sport held in Zurich, November 2012. *British Journal of Sports Medicine* 2013;47(5):1-11.