

Title: Management of brain injury in non-elite field hockey and Australian football – a qualitative study.

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Word count: 1319

Key words: non-elite, head injury, concussion, sport,

Type: Brief report

Abstract

Issue addressed: This study aimed to assess the current understanding of brain injury in sport, and to identify existing management and return-to-play guidelines associated with mild traumatic brain injury (mTBI), in non-elite field hockey and Australian rules football in Western Australia.

Methods: In-depth interviews were conducted with key injury management personnel in non-elite field hockey and Australian football in Western Australia.

Results: None of the twenty clubs surveyed followed a standardised procedure for the management of head and brain injury in their team or sport.

Conclusions: Findings from the study indicate that the management of head and brain injury was variable, subjective in nature, and that there were no evidence-based guidelines available for the management of mTBI to any of the respondents in this study.

So what: Sporting associations and governing bodies should drive the development of evidence-based policies and guidelines that incorporate initial management of head and brain injury, and return-to-play guidelines following mTBI in sport. The primary focus of the initial drive should be towards junior sport where the incidence of head and brain injury is significant.

Background

The incidence of mild traumatic brain injury (mTBI) in sport is substantial, accounting for over 75% of all sports-related brain injury.¹ It is estimated that 15% of non-elite athletes in team sports sustain at least one mTBI each year.¹⁻⁴ The adverse outcomes of mild traumatic brain injury include: cumulative cognitive impairment; neuropsychological impairment; and decreased academic performance in children and adolescents. A reduction in the incidence of mTBI in sport has the potential to: increase participation in sport and recreation; minimise the risk of impaired neurological function; reduce health care costs associated with sport and reduce work or school absenteeism.⁵⁻⁶

The reported signs and symptoms associated with mTBI are varied, making definition and diagnosis challenging. They include: alteration in consciousness; amnesia; confusion; delayed cognitive responses; memory and learning difficulties; headache and irritability; ringing in the ears; photosensitivity; short term memory loss and sleep disturbance/problems.⁶⁻⁷ Some of these symptoms may be subtle and others may take a number of weeks or months to resolve. Furthermore, exercise can accentuate the effects mTBI that may not be apparent at rest.

There is no universal agreement on when it is safe for an athlete to return-to-play after sustaining a mTBI, however, if an athlete returns to sport while symptomatic, the risk of further injury is increased.⁸ Furthermore, the outcome of multiple brain injuries has been associated with chronic cognitive impairment.⁹⁻¹¹ Decreased reaction time is an important marker of mTBI.¹² If player reaction time is impaired, the risk of injury in contact sports such as the football codes, significantly increases.¹²

At present, the decision to return-to-play after sustaining a mTBI in sport is subjective and recommendations are inconsistent.¹² This is particularly true at community and junior levels of competition. Evidence suggests that younger players in contact sport are twice as likely to sustain a brain injury than their senior counterparts.^{10,11-13} This is indicative of the vulnerability of the adolescent brain to closed trauma.¹⁴ This injury remains a significant public health issue at all levels of competition, and in all age groups.⁵

Methods:

Data collection instrument

A questionnaire was developed to target those responsible for the initial management of head and brain injury in sport and validated with personnel who manage sporting injuries in sport¹⁵. Participants were approached through the Association Executives of the Western Australian Men's Hockey Association (WAHA), the Western Australian Women's Hockey Association (WAWHA) and the Western Australian Football Commission (WAFC). Permission to interview personnel on the sporting field was granted. Six managers, eight coaches, one assistant coach, two team physiotherapist, one team doctor and two sports trainers were recruited into the study (n=20). Each respondent was responsible for the initial management of injuries within at least one sporting club. All study respondents represented different clubs from within non-elite sporting associations representing over half of all possible clubs in the highest level of non-elite competition in each sport (n=20/31). Selection bias was minimised by recruiting respondents from the highest level of non-elite competition within the Perth metropolitan area.

Ethics approval for the study was granted from The University of Western Australia's Human Ethics Committee. Active consent was gained from all study participants prior to the completion of the questionnaire.

Results

Most of the respondents had someone to assist them in the management of injuries (n=14/20), mainly sports trainers (n=12/20 teams) and physiotherapists (n=11/20). When asked about the management of head or brain injuries on the playing field, nine respondents reported no set protocols were in place in their team. Half of the respondents (n=10/20) indicated they used some initial injury management procedures, however, the procedures varied between respondents (see Table 1). Most clubs did not have ready access to a medical practitioner (14/20) in the event of a head or brain injury. The majority of respondents had access to equipment to assist in the management of head or brain injured players (n=17/20). This included neck braces (n=9/20), first aid equipment (n=8/20), oxygen equipment such as oxy viva (n=4/20) and ice (n=2/20).

Insert Table 1

Respondents were provided with a synopsis of the study that included definitions of head and brain injury, particularly mild traumatic brain injury. They were then asked to describe how they managed the most recent suspected brain injury sustained by a player. The most common management procedure was to remove the player from the sporting field and, after initial assessment, instructing them to seek medical attention (n=9/20). Unless an ambulance was required, it was considered the players' responsibility to attend a medical facility (e.g. hospital

emergency department or sports injury clinic). Other management procedures included removal from the field, observation and wound management, if required (n=5/20).

Respondents were asked what they would do if they thought a player who had sustained a brain injury that required (further) medical attention. Twelve respondents said they would refer the player to the nearest hospital emergency department. Five respondents said they would first consult the team doctor (although there were only available at home games) then act on the doctor's advice. Three respondents said they would manage the injured player themselves by stabilising the neck and monitoring them (see Table 2).

Insert Table 2

When asked if their sport followed any set protocols for the management of head or brain injuries, five respondents were unsure if there was a set protocol to follow and 14 respondents said that their sporting association did not provide any guidelines on the management of players who sustain a head or brain injury, nor when it was considered safe for them to return to sport. Further investigation with the governing board of each sport confirmed there were no evidence-based guidelines available to manage head or brain injury in these sports in Australia.

Most respondents identified a medical practitioner as being responsible for decisions regarding return-to-play or training after sustaining a head or brain injury (n=13/20) and another five felt a physiotherapist could make this decision.

Discussion:

The findings from this study indicate that most respondents had at least one assistant to aid in injury management (n=14/20) and equipment to manage head or brain injuries (n=17/20). In the event of a player being injured, it was likely they would be treated by someone who had at least some basic training in managing injury in the field.

Of concern was the variability of treatment that injured players may receive. Almost half (n=9/20) of respondents did not use a set procedure for managing head or brain injuries. Of those that used set procedures, they varied between sport, and amongst clubs within the same sport. None of the procedures used had been scientifically validated. Two thirds of respondents (n=13/20) said they relied on a medical practitioner to assess suspected head or brain injured players, although most did not have immediate access to one at training or games (five had access to a doctor at home games only, none at training). These results are of major concern for three reasons. Firstly, mTBI can be difficult to assess in the field because of its complex symptomatology. Secondly, participants did not have ready access to medical assistance. Thirdly, there were no valid guidelines available to respondents to assess if players were ready to return-to-play after sustaining a brain injury. The latter is particularly significant as players who return-to-play before resolution of a mTBI may be at risk of exacerbating their existing head injury, or increasing their risk of subsequent injury.¹¹

Conclusions

The management of mTBI in sport is currently inconsistent and is based on subjective assessments. Players who sustain a mTBI may be at a greater risk of subsequent injury if they continue to participate in sport. While moderate, regular physical activity remains a national

health priority in Australia, it is essential that the risk of injury associated with physical activity, in this case sport, is minimised.

This study found that the primary injury management personnel interviewed did not have access to standardised protocols for the management of head or brain injury in sport nor were there any evidence-based guidelines available to support the management of return-to-play decisions in any of the sports surveyed.

Further research is urgently needed to address the management of all head injury in sport, including mTBI. This is particularly important at the junior level of sport as the risk of sustaining this type of injury is significantly higher in junior sport than in senior sport.

Acknowledgement: The author would like to acknowledge Nick Gray and Richard Gauci for their assistance with this project.

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Table 1. The procedures used to manage head and brain injury on the sporting field (n=20 teams)

Procedure	Respondents
'No set procedure'	9
This is made by team doctor 'Assess the injury, check neurological signs of concussion, if any concussive symptoms they are not to return-to-play for entire game. Player to have CT scan.'	5
'Assess to see how severe it is, either stretcher them off, or run them off. Check for signs of concussion. Suggest seek medical attention	3
'Find a doctor if home game and available. If not available, remove player from field of play and rest. Suggest seek medical attention.'	1
'Determine if serious. 1) Yes: have team doctor provide advice, possibly call ambulance. 2) No: Stop bleeding and apply bandage, check if vision is impaired. If loss of consciousness then stay off field.'	1
'1) ABC including cervical spine 2) GCS, conscious state etc 3) any other injuries e.g. bleeding 4) observe and reassess'	1

Table 2. Procedures followed when managing head or brain injury requiring medical attention (n=20 teams).

Procedure	Teams
If 'required further treatment would refer to hospital +/- ambulance'	2
'Maintain stable body position. Check eyes, check vision. Rest person... call an expert'	1
'Stretcher off and call an ambulance'	1
'Player off the pitch (with stretcher if needed) medical attention ASAP at the ground/ hospital'	3
Unknown	1
'Send them to emergency' +/- ambulance'	5
'Have player taken to hospital' 'not to drive themselves'	1
'Call for medical assistance'	3
'Check for concussion, manage bleeding, ask for ambulance if severe'	1
'Phone the doctor & accompany player there... pass on as much information to the doctor as possible'	1
'Team doctor to make assessment'	5
'Stabilise neck'	1