

The Gentleman's Game Has New Rules for Concussion: Possible Impact and Controversies

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Abstract

Background When Jofra Archer bowled that fateful bouncer that felled Steve Smith, arguably the best batsman in the world, the gut-churning incident revived images of the horrific Phillip Hughes tragedy. Fortunately, Smith was soon up and about, but he was forced off the ground by the medicos. Less than an hour later, the 30-year-old came back to the crease to resume his innings on 80 not out but he did not look right. He soon fell for 92—the first time he was dismissed under a hundred in the series—to a misjudgment that he would never make normally. Following this, discussions regarding concussions in sports in general and cricket in particular had been reignited throughout the world.

Methods We reviewed all available literatures on concussion in cricket and also reviewed all possible guidelines issued by the International Cricket Council and Cricket Australia on concussion. The latest guidelines issued on May 23, 2019 were kept as the basis for this article. Causes and possible methods/steps in management of the same were considered.

Discussion Sport should not be played at the cost of lives and mental well-being of the players. The guidelines issued are very exhaustive and useful but have no meaning if they are not implemented properly. Sports-related injuries are often considered trivial but considering recent events, they are not. There is a spectrum ranging from craniofacial injuries to concussion, leading to career and even life-ending injuries in professional cricket. In retrospect, most of the injuries were concussions but they had a lasting impact on the players' career.

Conclusion Appropriate medical personnel must be present at all times to cover all matches (preferably having experience in head injuries). The decision on the medical personnel pervades any stage of the game and substitutes should be considered immediately, with return to play only after proper evaluation, and clearance has been obtained.

Keywords

- ▶ cricket
- ▶ sports injuries
- ▶ concussion
- ▶ head injury

Introduction

Concussions are the most common form of head injury and are defined as “temporary unconsciousness or confusion and other symptoms caused by a blow to the head.” It has taken

us a long time to realize the disease burden in professional cricket, as cricket, contrary to high-intensity contact sports like American football or rugby, is not a contact sport by definition. Cricket, as a game, has a stop–start nature, rather than a continuous flow. Out of all Australian sporting codes, cricket requires the most protective gear to properly guard

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the batsmen against a variety of injuries that can be afflicted all over the body.¹ Proper and timely identification of injury burden remains the first step in the solution process. Interestingly, cricket was the first major international sport to publish recommended methods for injury surveillance.^{1,2} The incidence of injuries varies with the formats of the game, with lesser injuries reported in the T20 format in comparison to the one day international (ODI) or test format. Similarly, the injury profile is less dangerous in women's cricket than men's cricket. It is heartening to see that the International Cricket Council (ICC) has recognized the need for stricter rules and the presence of concussion in professional cricket. In this Ashes series, Australian captain Steve Smith was taken off the field after being a victim of a brutal bouncer from debutant Jofra Archer. Under the new concussion guidelines for cricket, Steve Smith became the first-ever cricket player to be replaced with another teammate Marnus Labuschagne in like for like rules.

A Need for Awareness

All players, supporting staff, and officials should be aware of the risks of concussion and measures for its early identification and prevention. As a single event of injury, concussion does not pose a serious threat to the player, but the real dangers start when a person gets repeated concussions from subsequent impacts in a similar way. The second-time injury is more serious than the first as the neural functions are still recovering and the body has a slower reaction time after the primary injury. The cumulative insults are disastrous for physical, psychological, and neurological well-being as it may lead to permanent brain damage and, rarely, death. Will Smith has beautifully portrayed the consequences of the same in the Hollywood movie "Concussion."

"If in doubt, sit it out." This statement has a different meaning in different formats of the game. It means that the player cannot return to the game in ODI or T20 format unless another medical professional reverses the diagnosis, certified in the management of concussion.³ Cricket is not a traditional contact sport. However cricket players, especially batsmen, bear the brunt of the injuries followed by wicket keepers and fielders. The injuries are incurred by ball, bail, and collision with other players. Concussion injuries in cricket are more frequent than considered earlier. Nearly 15 to 20% of all head impacts land in concussions. Even among the bowlers, 55% of the time-loss injuries in fast bowlers were due to injuries not related to fast bowling, such as finger fractures, medical illness, or concussion. Quite interestingly, fielding-related injuries caused 73% of all matches lost, largely due to concussions and finger injuries in the first report of injury surveillance in the women's T20 cricket format.¹ Cricket Australia (CA) issued its updated concussion guidelines on May 23, 2019 (► **Table 1**), which became the benchmark for the regulations. The guidelines were based on the 2017 Berlin Consensus Statement on "Concussion in Sport." Concussion reporting will be increased significantly in the coming days, and there has already been a significant increase in awareness, education, and training regarding concussion. Several precedents exist in other forms

of sports-related injuries⁴ and hence, it may not be wise to ignore the warning signs.

The Battery of Tests in Concussion

Controversy looms around the diagnosis of concussion, as most of the signs and symptoms are very nonspecific. The onset of symptoms or signs might be rapid, evolving, sometimes having a delayed onset by up to 48 hours, and have rapid resolution. There is a separate battery of tests for correct and timely diagnoses such as sport concussion assessment tool 5th edition (SCAT5). The SCAT5 can be applied to the players up to 13 years of age, while child SCAT5 should be used for players in the age range of 5 to 12 years. After head injury and proper evaluation with SCAT5 suggesting no concussion, it cannot be ruled, as delayed onset is not uncommon (in 10–20% of total concussions). SCAT5 is a proper battery of the test for critical exclusion or identification of a dubious case of concussion and it takes at least 10 minutes to properly evaluate. A player considered concussed on the formal evaluation with SCAT5 should be immediately taken off the ground for further assessment (e.g., radiology) and should not be allowed on the field in any case on the same day. A player considered nonconcussed on SCAT5 might be allowed to be on the field again but should be repeatedly evaluated at frequent intervals for the development of new signs/symptoms. A formal assessment should be repeated after 24 and 48 hours of the injury with repeat implementation of SCAT5.

A concussed player can return to the play after an interval of a week; however, this is highly individualized and should be gradual. The oversight of the team medic is necessary for deciding the timing and grade of return. If at any point of graded return, the patient starts feeling the same complaints, the player should be reassessed at the level of graded exercise with further evaluation. In cases of complicated concussions when the symptomatology persists beyond 3 weeks, the player requires detailed neurological, neuroradiological, and neuropsychological assessments. It is always an ideal situation to have baseline testing with SCAT5, CogSport, and IMPACT or pen and paper cognitive screening tools for baseline evaluation.^{5,6} The same can be checked for reassessment and the player should be allowed to play after return to the baseline levels.

Given varied presentation and time duration, a concussion is difficult to diagnose. Another difficulty involves prejudices and prohibitions on the player and team medicos in declaring the same.

Players at the elite level, even realizing that "something is wrong after the injury," hide the symptoms as they might be pulled out of the game if they were identified as concussed. With the new guidelines, only a medical officer with previous experience in the field may declare that a player is fit to play. The coaches are also warned against rushing their players back into play once they are concussed. Numerous studies have mentioned return to play guidelines (RTP; ► **Table 2**) and SCAT-5 (► **Table 3**) guidelines for early identification and management of concussion. CA endorsed the 2017 Berlin Consensus Statement

Table 1 Summary of the 2019 Cricket Australia concussion protocol (applies to all male, female and pathway players and all match officials)

Situation	Assessing official	Outcome	Action required
After head trauma	Highest medical personnel present	No concussion suspected	<ul style="list-style-type: none"> No further immediate action is required. However, the medical personnel should monitor the participant for delayed presentation of a concussion.
		Suspected concussion	<ul style="list-style-type: none"> Medical personnel inform umpire and person must leave field-of-play/training for further assessment. The umpires will stop play until the person leaves the field of play. Replacing the person will be dealt with under the relevant playing conditions.
After suspected concussion	Appropriately qualified medical personnel administer the following: SCAT5 and CogSport tests. Assessment will take ~20–30 minutes	Diagnosed concussion	<ul style="list-style-type: none"> Person must not return to play/training until cleared by medical personnel.
		Concussion not diagnosed	<ul style="list-style-type: none"> Person is free to return to play/training (but is to be monitored by medical personnel for a delayed concussion). Activation of the concussion substitute is NOT a medical decision; however, it can only be made after the diagnosis of a concussion. This decision to activate will need to be made by team management in accordance with the relevant playing conditions.
Follow-up	Person completes SCAT5 and CogSport tests on same day as impact trauma	No delayed Concussion diagnosed/suspected	<ul style="list-style-type: none"> Clinical review (phone or in-person) before next training session or match: or within 48 h (whichever comes first). If no further suspicion, then the person is free to continue play/training (to be monitored by medical personnel for a delayed concussion).
		Delayed concussion diagnosed/suspected	<ul style="list-style-type: none"> Further clinical review required, including SCAT/CogSport tests before next training/match or within 48 h (whichever comes first).
Return to play	Medical personnel must be satisfied with: <ul style="list-style-type: none"> 24 h duration after injury Staged activity only which is monitored Person completes SCAT5 and CogSport tests, and clinical assessment prior to return to play 	Complete SCAT5 and CogSport tests	Can return to play.
		In-complete SCAT5 and CogSport tests	Continue clinical review and management of the concussion by medical personnel.

Abbreviation: SCAT5, sport concussion assessment tool 5th edition.

on Concussion in Sport and this policy aimed to be consistent with the consensus statement on the maximum extent.^{5,6} The Berlin Consensus has highlighted the need for universal mandatory use of helmet by all the players regardless of age. It also highlights the need for accessory attachments properly fitted to the helmet, which protects

the vulnerable areas of the neck and occipital areas of the batsman (neck guard). It also recommends the use of helmet by the umpires as per the CA playing conditions, articles of clothing, and equipment regulations. Whenever there is an impact to the helmet, it should be immediately returned to the manufacturer for further evaluation.

Table 2 Return to play stages as prescribed by Cricket Australia

Stage	Recommended activity
Complete physical and cognitive rest	<ul style="list-style-type: none"> Relative physical and cognitive rest for a minimum of 24 h postincident, and until all symptoms and signs have resolved.
Light aerobic exercise	<ul style="list-style-type: none"> Walking, swimming, or stationary cycling, maintaining intensity around 70% estimated maximum heart rate. No resistance/strength training.
Sport-specific exercise	<ul style="list-style-type: none"> Running drills, e.g., 10 × 50 m runs. Walk back to the start between repetitions. Not to exceed 80% estimated maximum heart rate. No cricket or strength/resistance training activities.
Noncompetitive skills training	<ul style="list-style-type: none"> Progression to more complex training drills, e.g., bowling drills (no batsman), fielding drills, and batting drills/throwdowns. Submaximal resistance/strength training. No additional conditioning.
Full training	<ul style="list-style-type: none"> Full participation in cricket and strength and conditioning training at a volume and intensity appropriate to the time lost to injury. Should include skills that challenge physical and cognitive capabilities.

The Controversy of Like for Like Rule: A Concussion Substitute

In the sport of cricket, a substitute is a replacement player allowed by the umpire when a player has become ill/injured after the nomination of the players at the start of the game. The busy and risky format of cricket requires better identification of the injuries; therefore, there were calls for a player replacement for safety assurance. After its implementation by New Zealand, CA, and Cricket council of England and Wales, ICC has agreed to allow the use of concussion replacements in all international cricket matches with “like for like replacement.”

As per the new concussion policy, players who show signs of concussion after a blow to the head will be instructed to leave the ground immediately for the assessment. CA states “under the concussion policy, a player who shows symptoms of a concussion is obliged to leave the field for a full concussion assessment by the most qualified medical officer present. If an assessment of concussion is suspected the player must leave the field for a full concussion test and cannot return until they are cleared by a medical officer.”^{5,6}

As expected, there is a place for debate in this rule, which demands its testing over time and acceptance among players, medicos, and fans. In 2005, ICC tried a tactic in the ODI format, whereby one substitute would be allowed for each team who has to be decided before the match and can

be introduced in the game at any point of time. However, it was widely criticized, as it was particularly a greater advantage for the team winning the toss and batting earlier. In the wake of a huge controversy, the rule was uplifted. Similarly, in the 2005 Ashes series, Ricky Ponting complained against the English team for substituting fresh fielders and replacing tired bowlers once their spell was over. ICC, later on, tightened the rules as they ruled that “substitute fielders shall only be permitted in cases of injury, illness, or other wholly acceptable reasons... and should not include what is commonly referred to as a ‘comfort break.’”⁷

How Effective Is a Cricket Helmet in the Event of an Impact

The purposes of the helmet are manifold: (1) deceleration and dissipation of the energy over a larger surface when hit; (2) protection from fatal impact; and (3) psychological assurance to any player that the game can be continued without any fear. But history has witnessed several accidents on the fields, some of which proved fatal despite adherence to the safety precautions. Mohotti et al³ have found that helmet provides a 60% pressure reduction in the event of an impact and there was a 36% reduction observed in the peak acceleration of the brain when wearing a helmet.³ Thus, wearing helmet results in a significant reduction in threat levels. A report published on injuries in cricket by Warren et al¹ stated that head injuries account for 23% of all cricket injuries. Out of these head injuries, 35% were fractures, 18% were contusions, 12% were sports-related concussions, and 11% were open wound injuries.^{1,3}

The guidelines have no meaning if they are not implemented properly. Sport should not be played at the cost of lives and mental well-being of the players. Sports-related injuries are often considered a stroke of bad luck or a chance injury in the bright glamour of cricket. However, they are not trivial as considered earlier. In our earlier publication, we have evaluated the spectrum of craniofacial injuries in professional cricket.² In retrospect, most of the injuries were concussions but they had a lasting impact on the players' career. If the ICC rulings are properly followed, we would likely be able to know the burden of the disease and the prevalence of injuries among players. Unfortunately, there is no consensus for the same in the Indian subcontinent. Such policies should be universally applicable and evaluated by the highest qualified medical personnel attending the team.⁷

Conclusion

All head injuries, especially concussions, should be taken seriously and those injuries need proper evaluation. The four Rs, recognize, remove, recover, and return, are fundamental for concussion management. Children and adolescents should follow an extended gradual return to play. We need to follow a more conservative approach than the one used for adult concussions, as the child and adolescent brains are still learning

Table 3 Sports concussion assessment tool (SCAT5 test steps valid for 13 years or older individuals)

Step	Assessment	Components
1	Red flags—players should be removed from play and immediately transported to an emergency room	• Loss of consciousness.
		• Severe and increasing headache.
		• Seizures.
		• Tonic posturing.
		• Vomiting.
		• Deteriorating alertness.
		• Severe neck pain or weakness.
2	Observable signs—witnessed or observed on video	• Motionlessness, facial injuries, blank stares, disorientation or confusion, and balance or gait difficulties.
		• The balance or gait issues occur on a spectrum, and many highly coordinated athletes will have a better ability to compensate for balance loss than other less seasoned athletes.
3	Memory assessment Maddock’s questions (child SCAT5 skips this)	• What venue are we at today?
		• Which half is it now?
		• Who scored last in this match?
		• What team did you play last week/game?
		• Did you team win the last game?
		Appropriate sport-specific questions may be substituted.
4	Glasgow coma scale	• Visual, verbal, and motor responses on a scale of 3–15.
		• Crucial component of any trauma assessment, especially in the acute emergency setting.
		• Intended to be performed serially when monitoring a suspected concussed athlete.
		• Only scored section of the on-field assessment process of the SCAT5.
5	Cervical spine assessment	• Pain free at rest?
		• If there is no neck pain at rest, does the athlete have a full range of active pain-free movements?
		• Is limb strength and sensation normal?

Abbreviation: SCAT5, sport concussion assessment tool 5th edition.

Note: any assessment < 10 minutes are not considered valid.

Further links:

- Full version freely available at: <https://bjsm.bmj.com/content/bjsports/early/2017/04/26/bjsports-2017-097506SCAT5.full.pdf>.
- For children less than 13 years old, child SCAT5 available at: <http://bjsm.bmj.com/content/bjsports/early/2017/04/26/bjsports-2017-097492childscat5.full.pdf>.

and changing. They should not return to play for at least 23 days.⁸ Historically, cricket has always been addressed as a gentleman’s game, although it is infrequently blotted with infamous injuries and feuds. Even though the injuries cannot be completely avoided because of the high-voltage professional nature and chances of impact, proper monitoring, surveillance, and timely management should avoid their consequences.

In cricket crazy countries like India, the game pervades every phase of our life. The impact of concussion injuries is visible in famous players of the game, but we believe this is just the tip of the iceberg. The vast majority of cricketers play the game at school, college, district, and state levels. These are the high-pressure testing grounds that can create the international player. These players do not receive high-quality on-field medical care; however, they do derive significant inspiration

from the rules and attitudes of international cricket. The real awareness needs to trickle down to these players, so that our favorite game can be played safely and our athletes can rise in their skill without being hindered by this debilitating problem.

Conflict of Interest

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