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Serious eye injuries to cricket wicketkeepers: A call to consider protective eyewear.

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SERIOUS EYE INJURIES TO CRICKET WICKETKEEPERS: A CALL TO CONSIDER PROTECTIVE EYEWEAR

In a recent cricket match the South African wicketkeeper, Mark Boucher, suffered a lacerated sclera when hit by a ricocheting bail [1] and the irreparable vision loss, photophobia and risk of further damage forced him to retire immediately from international cricket.[2] Commentators have referred to the incident as a *freak* accident[3] and that Boucher was *unlucky*;^[4] however, he is at least the third international wicketkeeper in the last 25 years to have their career cut short by an eye injury. English wicketkeeper Paul Downton was hit in the eye by a bail in 1990 and the consequential decrease in depth perception forced him to retire.[5] Indian wicketkeeper Saba Karim was hit in the eye by a ball in 2000, and he suffered a similar fate.[6] These international cases may represent the tip of an iceberg considering that wicketkeepers play in each of the many cricket matches played throughout the world. During his international career spanning 467 matches, Mark Boucher was exposed to 112 incidences where he was wicketkeeping at the moment a batter was bowled by a spin bowler. This highlights that, although his overall chance of being exposed to incidences where a spin bowler dismissed the batter by hitting the stumps was relatively low (0.25% of balls bowled by a spin bowler did so), the chance of being hit in the eye by a bail when this did occur might actually be higher than one may intuitively expect. This risk is exacerbated by the fact that the wicketkeeper's key role is to concentrate on the ball rather than the bails. Given the severity of the eye injuries experienced by Boucher and the other international wicketkeepers, prevention would clearly be valuable. Here we briefly address three potential solutions to protect the eyes of wicketkeepers: (i) modification of the bails, and the use of (ii) helmets, and/or (iii) protective eyewear.

Bails

The bails are two small pieces of wood that sit on top of the stumps to judge if, and when, the stumps have been hit. Unfortunately, their size and shape render them a clear danger to the wicketkeeper's eyes. Indoor cricket adequately accounts for this risk by directing that string be used to attach the bails to the stumps.[7] Although this is a logical suggestion that could readily be applied to outdoor cricket, it may meet emotional resistance; for cricket aficionados, there is something romantic about seeing the bails fly into the air when a batter has been bowled. It may be advisable, at least, to improve the finish of the bails. The official requirements for bails are only dimensional;[8] as a result, their ends (the *spigots*) may be ragged and have sharp right-angled endings. Although the primary concern is the impact force generated when the bail hits the eye, a requirement for rounded or bevelled spigots and a smooth finish to the bails may reduce the *extent* of eye injuries.

Helmets

There are at least two limitations in using helmets to protect the eyes of wicketkeepers: (i) helmets are not always worn when wicketkeepers are at risk of ocular injury, and (ii) there is no certainty that helmets will protect the eyes from a bail. It has become increasingly common for wicketkeepers to wear a helmet or, occasionally, a baseball-catching mask, when they stand 'up' (i.e., close) to the stumps. The frequency of wearing is not universal, not legislated and, evidently, has not been sufficient to prevent serious eye injuries.

Helmets are increasingly worn for wicketkeeping up to the stumps to faster-paced bowlers, but they are less frequently worn when keeping up to slower *spin* bowlers. Further, the increasing tendency for batters to play new and innovative shots that are intended to hit the ball over the head of the wicketkeeper (like the so-called *Dilscoop*) exposes wicketkeepers to new risks.

Even if it were mandatory to wear a helmet when keeping up to the stumps, there remain many instances where the wicketkeeper keeps back from the stumps, but runs to stand over the stumps when fielders return the ball or throw at the stumps. Helmets are the logical option to protect the face and head from the bat and ball (though see Abedin & Chen[9]), and for some protection from the bails. However, the compromises in helmet design necessary to achieve the most appropriate fit, thermal comfort and unrestricted vision mean that it is possible for the bails to reach the eyes by passing through the grill or between the grill and helmet peak. Mark Boucher was not wearing a helmet when he was hit and even if he was, it is entirely possible that the bail could still have hit his eye.

Protective Eyewear

Many keen observers of the game will recall the iconic footage of a cricket ball smashing the spectacles of the, then, Australian Prime Minister Bob Hawke, as he attempted a hook shot in a Parliamentarians vs. Media match in 1984. Fortunately, most modern spectacle lenses are more resistant to impact than the glass lenses he was wearing. We sought to evaluate whether Mark Boucher's eyes would have been shielded by protective eyewear. Standards for occupational eyewear require that lenses must withstand particular levels of energy transfer (in J). Spectacle-type occupational eye protectors must withstand 0.9J (low impact) or 6.2J (high impact) of energy transfer,[10] while sport-specific eyewear must withstand 18.7J (squash[11]) to 104J (baseball[12]). We obtained news footage showing Mark Boucher's incident and estimated the bail travelled at 17ms^{-1} (bail travels 1m in $\approx 60\text{ms}$); hence the energy transfer of the impact was approximately 2.3J (mean mass of a bail $\approx 16.2\text{g}$). Accordingly, spectacle-type occupational eye protectors (high-impact only) and all sport-specific eyewear would have met the required level to protect Boucher's eye. Only

polycarbonate-type materials meet these standards. An energy transfer of 2.3J, represented by impact of a 6mm steel ball at 77m/s, cannot be resisted by other ophthalmic materials.[13]

It is rare for cricketers to wear protective eyewear, but it is increasingly common to wear sunglasses when the sun and/or glare necessitate it (which can be rather infrequent in an English summer like Boucher was playing in). Sunglasses may provide a degree of physical eye protection, but polycarbonate lenses should be used to ensure adequate eye protection from impact injuries. Polycarbonate protective eyewear with clear lenses are readily available and may be a valuable addition to the kit bag of wicketkeepers to be worn when polycarbonate sunglasses are not required.

The introduction of new safety measures to protect athletes is often a slow process that encounters considerable resistance.[14 15] Former English captain Tony Greig was ridiculed when he batted wearing a helmet; today, junior batters are usually required to wear them, and although their use is not mandated at an international level, it is unusual to see an international batter without one. The National Hockey League in the USA mandated the use of ice hockey helmets in 1979, but incorporated a “grandfather” clause to allow existing players to sign a waiver and play without one. There is now considerable debate in the NHL whether a similar rule should be introduced to mandate the use of full facial protection as is the case for junior players. [16]

Just as a helmet protects the head and face of a batter, protective eyewear, with or without a helmet, provides an effective solution to protect the vision of wicketkeepers. Fortunately, the following response from the International Cricket Council (ICC) Medical Committee suggests that this is now on their agenda:

The ICC Medical Committee were alarmed by the recent career ending eye injury to a wicket keeper in South Africa and discussed the issue of eye safety at its recent meeting in July. Various possibilities were canvassed.

The committee is currently facilitating the revamping of testing standards of batting helmets which in the past have had design flaws which exposed players to serious facial and skull injuries. This revamp will assist the protection of eye injuries from the ball. Once the helmet design test standards have been completed, eye protection will also be further considered in light of the unusual circumstances of the recent South African case. The use of safety glasses would be one of the options considered.

In industry, occupational hazards of the type confronted by cricket wicketkeepers would mandate the provision of appropriate eye protection to workers. In cricket, efforts can be made to render the situation inherently safer or less hazardous by attaching the bails to the stumps or by modifying the sharp angles of the bails. More importantly, now may be an appropriate time for the ICC to consider a rule change to encourage the use of appropriate safety measures and personal eye protection for wicketkeepers.

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Competing interests

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Contributorship

Both authors wrote the manuscript and performed the analysis of the incident.

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