

## ORIGINAL ARTICLE

## Ocular injury in hurling

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**Objectives:** To describe the clinical characteristics of ocular injuries sustained in hurling in the south of Ireland and to investigate reasons for non-use of protective headgear and eye wear.**Methods:** Retrospective review of the case notes of 310 patients who attended Cork University Hospital or Waterford Regional Hospital between 1 January 1994 and 31 December 2002 with ocular injuries sustained during a hurling match. A confidential questionnaire on reasons for non-use of protective headgear and eye wear was completed by 130 players.**Results:** Hurling related eye injuries occurred most commonly in young men. Fifty two patients (17%) required hospital admission, with hyphaema accounting for 71% of admissions. Ten injuries required intraocular surgical intervention: retinal detachment repair (5); macular hole surgery (1); repair of partial thickness corneal laceration (1); repair of globe perforation (1); enucleation (1); trabeculectomy for post-traumatic glaucoma (1). Fourteen eyes (4.5%) had a final best corrected visual acuity (BCVA) of <6/12 and six (2%) had BCVA <3/60. In the survey, 63 players (48.5%) reported wearing no protective facemask while playing hurling. Impairment of vision was the most common reason cited for non-use.**Conclusions:** Hurling related injury is a significant, and preventable, cause of ocular morbidity in young men in Ireland. The routine use of appropriate protective headgear and faceguards would result in a dramatic reduction in the incidence and severity of these injuries, and should be mandatory.

Hurling is a game played in Ireland by an estimated 150 000 people, and is reputed to be Europe's oldest field game. It is a team sport, each side comprising 15 players. Hurling is played with a stick (camán) and ball (sliotar) (fig 1), but differs from hockey in that the player may handle the ball, which therefore spends more time in the air than on the ground. Of note, there is no restriction on the height to which the stick may be raised or the ball projected. Indeed, playing the ball overhead is a skill that defines the game (fig 2). Hurling remains an amateur sport, and its regulatory body is known as the Gaelic Athletic Association. Teams within a club are categorised according to age up to 18 years and thereafter according to their standard of play into junior, intermediate, or senior.

The stick is made of ash wood, is about 90 cm long, and is flat with a curved head, measuring no more than 13 cm in diameter, which tapers towards the handle (fig 1). The ball is composed of cork and wound string covered in leather, and measures 23–25 cm in circumference (fig 1).

Ocular trauma remains a leading cause of monocular blindness world wide. A study in the early part of the 20th century found that sports related injuries accounted for 0.7% of ocular trauma,<sup>1</sup> and this contrasts with more recent studies which report a figure of 2.3%.<sup>2</sup> Most commentators agree that the increasing emphasis on an active lifestyle and leisure activities in modern day living accounts for the increasing relative importance of sport as a cause of monocular blindness.

In hurling, the use of protective headgear is not mandatory.<sup>3</sup> Helmets, with and without wire cage facemasks, are available for players. However, of those who wear a facemask, many choose to modify it by removing some of its protective bars. Of note, the Gaelic Athletic Association rule book does not contain any standards for protective equipment.<sup>3</sup>

We report the results of a study investigating the nature of ocular injuries sustained in hurling and the reasons underlying players' reluctance to use appropriate protective eye wear.

## METHODS

## Analysis of ocular injuries

A retrospective analysis was undertaken of all ocular hurling injuries presented at the Departments of Ophthalmology at Cork University Hospital and Waterford Regional Hospital between 1 January 1994 and 30 December 2002. We would estimate that about one third of all hurling players live within the catchment areas of these two units. In Waterford Regional Hospital the cause of the injury is recorded on the medical records of the emergency department, whereas this is not the case in Cork University Hospital. Therefore an underestimate of the number of hurling ocular injuries is likely in this study, although we are confident that all cases requiring admission to either centre were identified.

The following data were retrieved for each case: basic patient details; mechanism of injury (ball, stick, or other); role in game (player, spectator, referee); nature of injuries sustained; length of stay (if any); management; number of follow up visits; visual outcomes.

## Analysis of use or non-use of protective headgear and eye wear

A total of 180 questionnaires were distributed, by hand, to players from six hurling clubs in Cork. Senior club officials were contacted first in order to gain support for the survey. The confidential questionnaire was designed to estimate the use of protective headgear and eye wear while playing hurling, and to identify reasons for non-use of such protective gear.

## RESULTS

A total of 310 ocular hurling injuries were identified. The vast majority of the injured were male, with women accounting for only 15 injuries (5%). Most of the injuries (296; 95%) were sustained by players, with the remaining 14 occurring in spectators (11; 4%) and referees (3; 1%). The mean (SD) age of the injured was 22 (9.66) years (range 6–71). Of note, the patient aged 71 years was a spectator. Ninety one of those



**Figure 1** A hurling stick with a hurling ball on the right and a tennis ball on the left.

injured (29%) were aged less than 18 years at the time of injury.

Ocular hurling injuries occurred in 152 right eyes and 158 left eyes, and the hurling stick was responsible for 142 (48%) of the 295 cases where the mechanism of injury was reliably recorded. Clinical findings varied, and in many cases multiple findings were recorded. Anterior segment injuries were more common than posterior. The most common anterior segment injuries were eyelid laceration and traumatic hyphaema, which were seen in 67 (22%) and 59 (19%) patients respectively. The most common posterior segment injury was transient retinal oedema, which was seen in 63 (20%) patients.

Of note, and beyond the clinical findings relating directly to the ophthalmic service, 23 patients (7%) were referred for maxillofacial advice because of fractures of the facial bones.

### Ocular hurling injuries warranting hospital admission

Fifty two patients (17%) sustained injuries that warranted hospital admission. Of these, the mechanism of injury was reliably recorded in 46: the ball was responsible for 23 and the stick for 23. The mean (SD) length of stay was 4.6 (1.78) days (range 2–10). Ten injuries required surgery: retinal detachment repair (5); repair of a macular hole (1); repair of a partial thickness corneal laceration (1); repair of a corneal perforation (1); enucleation (1); trabeculectomy for post-traumatic glaucoma (1).

### Visual outcomes

Of the 310 ocular hurling injuries recorded, a permanent visual deficit (<6/12) resulted in 14 eyes (4.5%). Seven eyes had severe vision loss (<6/60), and six of these were blind according to WHO classification (<3/60) (table 1).

Of these 14 patients, only three had suffered an anterior segment injury (two corneal lacerations and one traumatic glaucoma), and 11 suffered posterior segment injuries (four retinal detachments, three choroidal ruptures, two macular holes, one scleral perforation, and one commotio maculae).

### Analysis of use and non-use of protective eye wear

The questionnaire was completed by 130 players, giving a response rate of 72%. Respondents had a mean (SD) age of 24.5 (5.55) years, and had been playing for an average of 16.5 years. Players of all competitive grades were represented in this sample.

Sixty seven players (51%) reported using a helmet with a facemask as a matter of routine, 24 (18%) used a helmet without a facemask, and 39 (30%) players used no protective wear.

Of the 67 respondents who wore a helmet alone, 27 had personally modified it to include a facemask. In contrast, 12 players who did wear a facemask admitted to removing some bars which should have afforded protection to the face and



**Figure 2** Two hurling players competing for a dropping ball. Courtesy of Eddie O'Hare, Evening Echo, Cork.

**Table 1** Visual outcomes

Final BCVA	Number	%
6/4–6/12	282	91.0
6/15–6/60	12	3.8
<6/60	7	2.3
Unknown	9	2.9
Total	310	100

BCVA, Best corrected visual acuity.

eyes. Interestingly, of the 39 players who wore no protective gear at all, 30 had tried to wear protective headgear in the past but had found it unsatisfactory. Table 2 shows reasons given for non-use of a helmet with facemask. Players could cite more than one reason.

Of the 130 respondents, 45 (35%) reported having received an eye injury at some point in his/her hurling career. Of those, six were wearing a facemask at the time of injury, but this had been personally modified in three cases. Nineteen players (15%) said they would cease to play hurling if the wearing of facemasks became mandatory.

### DISCUSSION

Our study represents the largest analysis of ocular hurling injuries reported and the first investigation of reasons for non-use of protective eye wear by players. Hurling related eye injuries have been recognised as an important cause of ocular morbidity in Ireland for many years,<sup>4–6</sup> and accounted for 30% of all sports related eye injuries in one study.<sup>7</sup>

**Table 2** Reasons given for non-use of a helmet with facemask

Reason	Number of responses	%
It is uncomfortable	26	41
It is not necessary	2	3
It feels awkward	15	24
It impairs my vision	27	43
It is too expensive	0	
I play less well with the helmet on	7	11
It looks stupid	0	
Other	2	3

### What is already known on this topic

We know already that hurling contributes a large proportion of sports injuries seen in eye casualty departments in Ireland and that some of these injuries may have a poor visual outcome.

The vast majority of the ocular hurling injuries were in young men, with one third of those injured aged under 18 years. Although most of the injuries were not serious, 17% did require hospital admission, with hyphaema being the most common indication for admission. Unsurprisingly, posterior segment injuries were associated with poorer visual outcomes.

Six patients in this study are legally blind ( $\leq 3/60$ ) in one eye as the result of an ocular injury sustained while playing hurling. Of these, all were aged under 30 years and one was aged 16 years at the time of injury. As a result of loss of stereopsis and visual field, monocular blindness limits employment opportunities for young men and precludes the possibility of a sporting career. In many cases, there will also be cosmetic implications as a result of phthisis. In other words, the loss of vision in one eye is not a trivial inconvenience and should be avoided at all costs.

Beyond the financial, social, visual, and cosmetic cost to the patient and his/her family, the economic implications for the healthcare provider cannot be ignored. The 310 ocular hurling injuries reported here represented 294 days in hospital and 942 visits to the outpatient department.

The fact that serious ocular injury during hurling can be eliminated by the introduction of rules that render the wearing of protective headgear and eye wear mandatory warrants discussion. Rather than viewing sports injuries as accidents that are beyond the control of the individual, there is a consensus that most of these injuries can be prevented by the use of appropriate protective headgear and eye wear.<sup>8</sup> This is well illustrated by the successful campaign led by the Canadian Ophthalmological Society to reduce the number of eye injuries in ice hockey. Inspired by the success in Pittsburgh steel plants of the introduction of mandatory eye protection in reducing disabling eye injuries, the Canadian Ophthalmological Society encouraged the Canadian Amateur Hockey Association to change its rules in relation to the wearing of protective facemasks in 1974. In 1978 the Canadian Standards Association issued a standard for face protectors in ice hockey. These combined measures resulted in a dramatic increase in the wearing of protective facemasks, and the consequential decrease in eye injuries was subsequently documented by Pashby *et al.*<sup>9, 10</sup> In 1981 the use of protective facemasks certified by the Canadian Standards Association while playing hockey was made compulsory by the Canadian Amateur Hockey Association up to junior level, and this measure eliminated eye injuries in these players.<sup>11</sup> In professional ice hockey, facemasks are not compulsory, and many players, fearing that it would impair their performance, choose not to wear one. Hurling is a strictly amateur sport at all levels and so the risk of eye injury cannot be viewed as an occupational hazard as it is in professional ice hockey. Protective helmets have been in use in hurling since the 1970s, but helmets with facemasks only became available in 1985. Modern protective headgear, which conforms to the requirements of the European Union Medical Devices Directives, is available for players.

Information on the use of protective headgear at the time of injury in the patients reported here was often unavailable. However, when this information was reliably recorded, it was invariably reported that no protective facemask was worn.

### What this study adds

This is the largest study of hurling related eye injuries reported. We have recorded the entire spectrum of injuries seen and their visual outcomes. It is the first study to investigate reasons for non-use of protective eye wear by hurling players.

Our survey revealed that only three of the 45 (7%) questionnaire respondents who had sustained an ocular hurling injury in the past had been wearing an unmodified facemask, whereas 42 (93%) had not been wearing any protective eye wear at the time of injury. We acknowledge that the sample of players we questioned may not be fully representative of players throughout Ireland, coming as they do from clubs in one city. This sample, however, does represent a reasonably broad spectrum of hurling players in terms of both age and playing grade, and we are happy that it at least illustrates that the wearing of helmets with protective facemasks is not universal in the sport.

The most common reason cited for non-use of protective headgear was that it impairs vision. We believe that there is a period of adaptation before a player feels visually unhindered by the bars of the protective facemask, and that players should be encouraged to persevere with such protective eye wear.

However, other reasons, including discomfort and impaired playing performance were also cited by large numbers of players and cannot be ignored. This indicates that improvements in the design of protective eye wear are required. Interestingly, two players felt that protective headgear was unnecessary, suggesting that there is also a role for education of players as to the risks inherent in hurling. In the section of the questionnaire designated for free comment, some players suggested that the use of protective headgear was "cowardly", hinting at a culture of machismo which is present in many contact sports. This issue is clearly the most difficult to deal with, and young players must see their elder role models using protective eye wear if these preventable injuries are to be avoided.

In brief therefore we feel that the following measures ought to be taken to reduce the number of eye injuries in the game of hurling.

- (1) Standards for helmets and faceguards which are used in, and sold for use in, hurling should be formulated.
- (2) Once a decision on standards has been finalised, helmets with faceguards should be made compulsory for all players.

### ADDENDUM

The Gaelic Athletic Association Congress of 2005 passed a motion making the wearing of protective helmets with facemasks compulsory for all players engaged in hurling up to the age of 21. It was on the basis of the findings reported in this paper that this motion was passed.

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Figure 2 courtesy of Eddie O'Hare, Evening Echo, Cork.

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Competing interests: none declared

Consent has been given for the publication of figure 2.

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## COMMENTARY

Hurling is a major cause of sports associated eye injury in Ireland. Prevention of ocular trauma is always superior to any treatment, and this article highlights the fact that prevention needs to be available at an appropriate standard and that awareness of the problem of severe injury, with potential loss of vision, should be emphasised to players and even made compulsory for play to be allowed. If this prevents loss of vision in one young player, it will be worth while, and judging by the results of this paper, it would be several more than that.

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## ELECTRONIC PAGES

## Online case reports

The following electronic only articles are published in conjunction with this issue of *BJSM*

### An uncommonly serious case of an uncommon sport injury

A Abedin, H-C Chen

**Background:** A 55 year old man sustained a severe ocular injury when hit by a cricket ball even though he was wearing a helmet.

**Methods:** A suprachoroidal haemorrhage was drained and dense intravitreal blood was removed. An inferior buckle was applied with the use of intraocular gas. A macular haemorrhage resolved slowly.

**Results:** Despite several surgical procedures over 1.5 years, the final visual acuity of the patient was only 6/60 because of a dense macular scar.

**Conclusions:** Helmets worn as protection when playing cricket need to be designed better and be of better material. Eye protection should be worn at all levels of play.

(*Br J Sports Med* 2005;**39**:e33) <http://bjsm.bmjournals.com/cgi/content/full/39/8/e33>

### Isolated oculomotor nerve palsy from minor head trauma

C-C Chen, Y-M Pai, R-F Wang, et al

Isolated third cranial nerve palsies in head trauma patients can be the result of direct or indirect damage to the oculomotor nerve. They are usually associated with severe head trauma. We reported a case of isolated oculomotor nerve palsy associated with minor head injury. No initial loss of consciousness was recalled. Computed tomography (CT), magnetic resonance imaging (MRI), and magnetic resonance angiography (MRA) of the brain were normal. Previous reports in the literature were reviewed and the possible mechanism of injury was discussed. Head injuries are commonly seen in sports settings. Our case illustrated that even minor head trauma can cause isolated oculomotor nerve palsy in the absence of abnormal brain imaging findings.

(*Br J Sports Med* 2005;**39**:e34) <http://bjsm.bmjournals.com/cgi/content/full/39/8/e34>