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A Video Analysis of Helmet Area Injuries and Helmet Type Worn in Hurling and Camogie Over 2 Seasons

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Abstract

Introduction

The wearing of helmets became mandatory in hurling and camogie in 2010/2011. Prior to this, 51% of hurling injuries involved the area protected by the helmet. Since the introduction of mandatory helmet usage, injuries to the helmet area have fallen to 5%. Helmets worn are required to meet the National Standards Authority of Ireland, IS355 Standard. It is reported that some players wear helmets that fail to meet this standard.

Aims

We aimed to assess if players involved in potential helmet area injuries were wearing helmets that met the IS355 standard. We also quantified the financial cost of helmet area injuries by analysing the GAA Injury Benefit Fund for injuries related to the helmet area.

Methods

Full match footage was reviewed for 2 seasons of hurling and camogie. Potential injuries were defined as contact to the helmet area resulting in the player not resuming play within 5 seconds. We analysed these events to assess if the player was wearing a helmet that met the IS355 standard. We also obtained the insurance claim data from the GAA to assess the financial cost of injuries to the helmet area.

Results

129 potential injuries were identified in 56 hurling games. 86% of these involved non-standard helmets. 5.5% of injuries with non-standard helmets drew blood compared to 0% with standard. Non-standard helmets resulted in game stoppage that was 4.5 times longer.

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7 potential injuries were identified in camogie. 43% of these events involved players wearing non-standard helmets.

There were 24 helmet area injuries, costing €18,710, in the hurling Insurance Benefit Fund. In the report, 100% of injuries were reported as players wearing standard helmets.

Our results show that players involved in potential injuries are more likely to be wearing non-standard helmets. This leads to more significant injuries and longer game stoppages.
GAA rules state that players must wear a standard helmet to make an insurance claim. €18,710 was paid for injuries to players wearing standard helmets in those two seasons, implying a significant burden to players wearing non-standard helmets.
The GAA should enforce the wearing of standard helmets in order to reduce injuries, reduce the cost of injuries and reduce stoppages in play.

Introduction

Hurling is an amateur field sport played predominantly in Ireland, involving two teams with a stick, called a hurley, and a ball, called a sliotar.[1] Camogie is the female version of the sport and has very similar rules. They are organised and regulated by the Cumann Luthcleas Gael (GAA) and Cumann Camógaíochta na nGael (Camogie Association) respectively. Both sports require a high degree of skill, fitness, physicality and bravery.[2] There are 15 players on each side. It is known as the fastest field sport in the world and as such collisions between players can carry significant force. Between the two sports, there are almost 400,000 active players worldwide.[3,4] All players, including those at the elite level, are amateur. Players represent their local community and then representative teams of each county compete at the elite level for the All-Ireland Title.

The wearing of protective headgear first came into the sport in 1968. Initially players wore helmets without any face protection. The helmets with face guards now worn by players are required to meet the National Standards Authority of Ireland regulation IS355.[5] This standard was last updated in 2006. For the sport of hurling in 2005, the wearing of helmets became mandatory up to the Under 18 age group, this was extended to Under 21 in 2007 and to all players in 2010. For Camogie, they became mandatory from 2011 onwards. Up until this point, it was at the discretion of the player if they wore a helmet. Previous studies have shown that helmet area

injuries accounted for 51% of injuries when players are wearing no head protection, 35% when wearing helmets without faceguards and 5% when helmets with full faceguards are worn.[6] Modifications are often made to helmets meaning that they no longer meet the IS 355 standard. Players have cited style, restricted view and comfort as being reasons to modify their helmets. Up to 31% in one study of hurling and camogie players reported modifying their helmets, with 80% of these modifying the faceguard.[7] Due to the fast, physical pace of the game, injuries to the helmet area range from soft tissue, boney, ocular, dental and concussion. A case series from a hospital in Ireland highlighted the dangers of players receiving penetrating limb injuries from modified faceguards worn by other players.[8] A retrospective analysis of two seasons of inter county hurling matches has shown that there were over 180 potential concussive events in those seasons.[9]

The IS 355 regulation has been drawn up by the National Standards Authority of Ireland in response to a requirement by the GAA and Camogie Association and other interested parties. The intention of helmets is to reduce the risk of injury to the skull and the part of the face surrounded by the protector that may occur in play or training. The protective function is such that the force from impacts against the protector is distributed and damped and the penetration of objects is counteracted. Helmets for hurling and camogie players shall comprise a head protector and an associated face protector. This standard sets out minimum requirements and test methods.[5]

Our study aims to assess if players involved in potential helmet area injuries while playing senior inter county hurling and camogie matches are using helmets that do not meet the IS 355 standard. We have also evaluated the GAA insurance data from this period of time in order to evaluate the financial cost of helmet area injuries to the organisation, which has not been evaluated before.

Image 1. Non IS 355 Standard Helmet

Image 2. Is 355 Standard Helmet

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Methods

Available full match footage of 2 seasons of senior inter county hurling and camogie was obtained from resources, GAAGO, RTE Player, TG4 Player, YouTube and Camogie Association. The seasons reviewed were the 2018 and 2019 seasons. The footage was reviewed using QuickTime Player v10.5 which enables high quality frame by frame footage. These matches were reviewed by 2 independent reviewers in order to identify potential helmet area injuries. The footage was then reviewed to identify if the player involved in the event was wearing a standard or non-standard helmet.

Video analysis is a validated method of identifying signs of injury.[10] We defined potential helmet area injury as any event in which a player is unable to purposefully return to play within 5 seconds of a direct or visible helmet area contact. This has been modified from a previously validated definition of potential concussive events which used the same criteria.[11] Reviewers recorded the nature of the potential helmet area injury, whether the player required medical attention, whether they left the field of play, whether blood was drawn and if and for how long play was stopped.

Reviewers also trained in identifying what constitutes a non-standard helmet. A non-standard helmet was defined as one that never met the IS 355 standard from when it was manufactured or an IS-355 standard helmet that has been subsequently modified so it no longer meets the specifcations. This was done by sampling and becoming familiar with the available IS355 standard helmets on the market in Ireland. We then reviewed helmets with the modifications that are commonly made, for example, changing of the standard face guard, changing of the chin straps, removal of visible lining of helmet and helmet purchased before the introduction of the IS355 standard. Each event was reviewed by 2 reviewers, independently, to assess if the event constitutes a potential helmet area injury and to identify whether the helmet met the IS355 standard or not. A third, trained, reviewer then assessed each potential injury and helmet to ensure agreement with both the potential injury and the helmet standard.

To test for reliability five matches, not from the seasons included in the study, were reviewed independently by the reviewers for raw agreement in the identification of potential helmet area injuries and for identification of helmet modification. Agreement was 100% for both identification of potential injuries and helmet modification.

The GAA were also contacted and they provided the details of the insurance payments made regarding helmet area injuries for 2 seasons of hurling. They released the data from their Injury Benefit Fund. This data included what area of the body was affected by the injury, whether an IS 355 helmet was reported as being worn and the financial payment that was made. The data was anonymised and no player could be identified. Unfortunately, the Camogie Association were unable to provide the same information.

Data analysis was performed using SPSS 28.0.1. Descriptive statistics were reported as counts and their associated percentages.

The GAA Injury Benefit fund was analysed by filtering for senior intercounty team member payments. The number of payouts alongside the total amount (€) in each payout was used to determine the average payout per injury. This data was anonymised and not possible to compare to the potential injuries that we had identified from watching the game footage

The research described in this project was formally approved by the Social Research Ethics Committee of University College Cork.

Results

A total of 129 potential helmet area injuries, which resulted in the player not being involved in the game for at least 5 seconds, were identified in 56 hurling games over the 2 seasons that we studied. This amounts to 2.3 helmet area injuries per match or 32.9 helmet area injuries per 1000 minutes game time. The 56 games reviewed represented the majority of men's senior championship games as there are 29 games per season.

111, 86%, of these potential injuries were in players wearing helmets that did not meet the IS355 standard. We observed that 5.5% of the injuries involving players wearing the non-standard helmet drew blood, compared to 0% of injuries in players wearing the standard helmet. Players sustaining a potential helmet area injury while wearing a non-standard helmet resulted in 4.5 times greater stoppage in game time.

Game Time Stoppage (seconds)

Helmet Type	*Number of Potential Injuries*	*Relative Number of Potential Injuries (%)*
Standard	18	14%
Non-Standard	111	86%
Total	129	100%

Game Time Stoppage (seconds)

Helmet Type	5-30s	30-60s	>60s	**Total**
Standard	9	3	1	**8 minutes**
Non-Standard	50	31	5	**36 minutes**
Total	59	33	6	**44 minutes**

In the 2 seasons of camogie that were studied, a total of 7 potential helmet area injuries were identified in 14 games. This amounts to 0.5 potential injuries per match or 8.3 helmet area injuries 1000 minutes. 43% of these potential injuries were in players wearing non-standard helmets.

From analysis of the GAA Injury Benefit Fund, we observed that throughout the seasons studied, 24 helmet area injuries received payments amounting to €18,710 (€779.60/payment). This was across senior intercounty teams. 100% of the payments documented in the GAA Injury Benefit Fund were to players wearing a standard helmet.

Discussion

From our study of 2 seasons of hurling the vast majority, 86%, of potential helmet area injuries occurred in players wearing helmets that do not meet the IS355 standard. These potential injuries resulted in longer stoppages in play and in more serious injuries when compared to those in players wearing the standard helmet. This is the first study of this nature conducted in hurling, camogie or similar sports such as ice hockey or lacrosse.

The GAA Injury Benefit Fund payment of €18,710 for 24 injuries is a significant financial cost to the GAA. It is noteworthy that all the payments were documented as being to players that were wearing standard helmets at the time of injury. From our study, 86% of potential injuries were in players wearing a non-standard helmet, this implies that there may be a large financial burden to the player as they are not able to claim for injuries while wearing a non-standard helmet. This also does not take into account the cost to the HSE of providing emergent and follow-up care, nor the psychological, social, educational and employment costs that helmet area injuries may result to the player.

In camogie, 43% of the potential injuries identified were in players wearing non-standard helmets. There also seemed to be a lower rate of potential injuries in the sport compared to hurling, 0.5 potential helmet area injuries per match vs 2.3 in hurling. It suggests that camogie players are more compliant with the wearing of standard helmets. Unfortunately, the sample size for camogie in our study is much smaller than hurling, this is due to lack of availability and inferior video quality of matches that can be watched retrospectively. Also, due to the structure of the Camogie Association's insurance, we were unable to obtain the data on payments made for helmet area injuries.

There is a wide range of sources for helmets that do not meet the GAA and Camogie Association's IS 355 standard. These include sports shops, online sales platforms and private mobile sales personnel to name a few, who sell helmets not of the standard or helmets that were of the IS 355 standard and subsequently modified. In addition to this, players frequently purchase helmets of the standard and subsequently modify these to suit their personal tastes. The GAA has previously had a grant in place in order to help teams and players purchase standard helmets. This was unfortunately removed in 2020. The modification of helmets by players has been quoted to be done in order to improve visibility.[7] When reading the IS355 specifications, it shows that the minimum field of vision while wearing the helmet, is similar to what the human eye can see while not wearing any headgear.[5]

It is also worth noting that the wearing of non-standard helmets is against the rules of both games and may be offering a competitive advantage to players if they are not using the approved equipment. At present, there is no assessment of players helmets prior to games to ensure that they meet the standard. This is currently done in Gaelic Football, another GAA sport, to ensure players are wearing gum-shields. It is also done in sports such as Association Football to ensure players are wearing shin-guards and rugby to ensure players are wearing gum shields. While it is understandable that this could be a challenge to officials, we feel that it would be an important step to improve the safety of the sport.

Limitations of the study include the difficulty in getting full match footage from the seasons studied. As such it was not possible to view all matches. For hurling, there were 58 senior inter-county championship matches in the 2 seasons. In Camogie, there were 54 games in the 2 seasons. Unfortunately, very few of these games were accessible to watch retrospectively in order to analyse for this study. Also, many games involved a single camera so the quality of footage available was low making it difficult to identify potential helmet area injuries and the type of helmet worn. Another limitation was the lack of availability of insurance data from the Camogie Association, due to the different structure of the insurance, we were unable to obtain this.

From our study, it is evident that the majority of potential injuries involving the helmet area in senior intercounty hurling are in players that wear protective helmets that do not meet the IS355 standard. This leads to more serious injuries and longer stoppages in play. It leads to a significant financial cost to the GAA.

Firstly, we recommend that the GAA enforce the rule of players wearing helmets that meet the IS355 standard and that helmets should be inspected before the game begins. Secondly, we recommend increased education of players, mentors and the wider playing community, in order to improve awareness of the need to wear these helmets. Consideration by the Associations to penalise players or teams with non-compliance of these safety rules of the association would likely improve compliance levels. This could be integrated in a phased basis like the successful introduction of the helmet and faceguard from 2005 - 2010. We also advocate the re-introduction and enhancement of the GAA assistance fund to help purchase approved helmets. Finally, we recommend that the sale of helmets that do not meet the IS355 standard should be reported to consumer protection groups to safeguard the players, and parents, who may be subject to unsafe goods and misleading information. We think that these measures will ensure the safety of hurling and camogie into the future.

Declarations of Conflicts of Interest:
None declared.

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