Tithe an Oireachtais
An Comhchoiste um Shláinte agus Leanaí

Tuarascáil ar Chomhtholgadh sa Spórt.

Nollaig 2014

Houses of the Oireachtas
Joint Committee on Health and Children

Report on Concussion in Sport

December 2014
Chairman’s Foreword

International research and a growing body of evidence from domestic sports suggest that sports-related concussion is a significant problem.

A number of developments in Irish sport such as the faster pace of games, increased and more intense tackling, and the ‘bulking up’ of players pose a challenge for sporting organisations, schools and players alike.

In recent years, high profile and very serious concussion incidents across a number of sports at amateur and elite level have served to underline the problem.

Arising from such concerns about player safety and risks from sports-related head injuries, the Joint Oireachtas Committee on Health and Children decided to commence hearings on Sports and Concussion.

The purpose of the hearings was to investigate the available evidence of sports-related concussion, current risks to players, and measures to protect them in the future.

The Committee sought more evidence to help policy-makers consider what measures should be taken to protect Irish sports men and women. In doing so, the Committee held four sessions, including detailed evidence from key sporting organisations medical experts and health practitioners.

The Committee undertook these consultations with open minds, and we are grateful for the time and testimony of those stakeholders who contributed to the Committee sessions. Three written submissions were also received from The Education Sports Trust, Dr. Willie Stewart and Mr. Cliff Beirne.

We believe that the Committee sessions form a useful body of evidence on this issue. For the first time in Ireland, the sessions allowed key stakeholders to discuss this issue in a parliamentary forum.

The Committee was struck by the willingness of all sporting bodies to take measures to reduce the risk of concussion and brain injury in Irish sport.
Although a lot of progress has been made in this regard, it was also very clear from the testimony that sports concussion is a growing risk, particularly in relation to schoolchildren and amateur sports men and women.

More could be achieved by all of the stakeholders pooling their expertise to work on a common strategy across Government Departments, sporting organisations and educational institutions.

Informed by these public hearings and submissions received, we have prepared this report with a number of practical recommendations to be considered by Government.

I would like to express my appreciation to my fellow Members of the Joint Committee whose commitment in producing this report is very much appreciated.

___________________________
Jerry Buttimer, T.D.
Chairman
Joint Committee on Health and Children
Joint Committee on Health & Children

31st Dáil
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| (Sinn Féin) |
| Robert Troy TD  
| (Fianna Fáil) |
SENATORS

<table>
<thead>
<tr>
<th>Senator Colm Burke</th>
<th>Senator John Crown</th>
<th>Senator John Gilroy</th>
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Recent trends in Irish sport have led to concerns around player safety. Leading Irish sporting and medical experts have highlighted the risks of brain injury posed by increases in heavy tackles and serious collisions in various sports.

At the professional level, a number of developments have increased risks to player safety. Generally, the pace of games has quickened, training regimes have radically intensified, and there has been a noticeable increase in the physical stature of players in field sports. For example in elite rugby, players are much bigger, and the number and intensity of collisions has increased over time.

The amateur level also witnessed a small number of traumatic head injuries linked to sporting tackles. In addition, the phenomenon of school athletes “bulking up”, along with the growing use of Creotene and similar products is seen as a significant problem.

Recent lawsuits against the NFL in the USA, as well as high profile serious concussion incidents in soccer, rugby and GAA matches, at elite and amateur level, shine a spotlight on concussion in Irish sports.

A growing body of international research is changing how the impact of sports concussion is understood, and this is driving reform. Consequently, sporting organisations are prioritising education, awareness and player safety.

The Joint Oireachtas Committee on Health and Children decided to examine the important issue of sports and concussion, with a view to making recommendations to the Oireachtas and to the Minister for Health.

Key issues were identified through stakeholder submissions and a review of academic reports.

Committee hearings were held on October 2\textsuperscript{nd} and 9\textsuperscript{th} 2014 with testimony from medical experts linked with major Irish sports, in addition to evidence from Government Departments and key sporting organisations. The Committee hearings in themselves offer a useful body of evidence. The transcripts are available in section 3 of this report on page 36.
Main Findings

- The Committee Report highlights the potential risks associated with sports concussion. We heard expert testimony including increased reporting of head injuries among school athletes experiencing concussion as a result of tackles on the pitch.

- We are particularly concerned at recent developments in Irish sport, which, if they continue, will serve to exacerbate these risks, and could lead to an increase in fatalities and brain injuries, particularly for non-elite athletes and children.

- Concussion can be fatal, particularly if the player is left in a game and sustains a second impact; this is known as Second Impact Syndrome.

- In addition to the immediate dangers of concussion, there may be longer-term effects, with some evidence indicating that repeat concussions can lead to early onset dementia or Chronic Traumatic Encephalopathy (CTE), a progressive degenerative disease of the brain.

- Although there is no research demonstrating a conclusive causal link, Irish medical experts generally recognise an association between concussion and CTE. Indeed, one medical expert recommended that concussion be called mild traumatic brain injury in order to draw attention to its seriousness.

- While some individuals are prone to concussion, others never get concussed. In addition, there are some groups in which concussion may be particularly dangerous: younger players, non-elite players and females.

- The risks posed by concussion for younger people are especially significant. Importantly, their concussion injuries also present with different symptoms. Concussion in children and younger people therefore should be managed differently, with a longer period of rest from sports and other activities, such as homework and computer games etc.

- Non-elite players are also at greater risk from concussion, as they do not have access to the same level of medical attention as professionals.
• Under US regulation, a concussed player must be removed from play immediately and cannot return to play until they are judged fit by an independent medical person (not the person who first diagnosed the concussion).

• The Zurich 2012 consensus statement on concussion reflects best practice in the management and treatment of concussion in sport. The statement urges that anyone suspected of suffering a concussion be removed from play immediately and not return to play until they have been cleared by a medical practitioner.

• While most sporting bodies in Ireland agree with this approach, in practice there have been several high profile confirmed incidents of concussed players returning to play within minutes of the initial injury, putting them at risk.

• Schools and sporting organisations have a particular duty of care to children and young people active in sport, and they need to be far more pro-active in reducing the risks of sports-related concussion.

• Many sports have a policy of conducting short sideline assessments such as the SCAT3. In professional rugby, the Pitch-side Concussion Assessment (PSCA) was launched on a pilot basis in 2012.

• Some recent evidence suggests that the PSCA is an effective tool in reducing the number of concussed players returning to play. However, the symptoms of concussion may not present immediately, and reliance on sideline tests could place players in danger if it means they return to play while concussed.
Key Issues

- **A lack of resources for dealing with concussion**: The scarcity of concussion clinics as well as the difficulty in accessing neurologists and neuropsychologists was highlighted by stakeholders as a cause for concern.

- **Some groups are at greater risk from concussion**: Children report symptoms of concussion differently than adults and may bleed from the injury. As such, they must be managed differently and with a longer period of rest.

- **Non-elite athletes** do not have access to the same level of medical support as professionals and may therefore be at greater risk from concussion. Also, some studies suggest that females experience concussion more severely than males although the research on this is inconclusive.

- **Use of helmets and other protective headgear**: helmets and other protective headgear such as scrum caps do not protect players from concussion, notwithstanding the recognised need for helmets and other protective headgear in certain sports including the game of hurling where it is obligatory to wear one. Some medical experts argue that in certain sports, they provide a false sense of security and in some instances may cause damage to the neck.

- **Awareness and Education**: the Committee hearings identified the need for greater awareness among parents, players, coaches, managers and doctors around concussion in sports.

- **A lack of research and data**: There is not enough data on the incidence of concussion in sport in Ireland. Also, there is a lack of longitudinal research on concussion in sport which might shed light on the long-term effects of the injury.
1. The Committee supports the Zurich 2012 Guidelines and its application across Irish sports disciplines at all ages. **As a general principal, it is essential that any players experiencing or displaying symptoms of concussion are immediately removed from play, regardless of pitch-side assessment, and that they follow a graduated return to play protocol.**

2. The Committee strongly urges the acceleration of research on sports and concussion in Ireland. International co-operation, involving the pooling of data, may be the best way forward and could add a valuable insight into the condition.

3. A collaborative approach should underpin the Government’s approach to embedding the Zurich Guidelines in Irish sport with the aim of reducing sports concussion risks.

4. Despite considerable achievements by the IRFU and the GAA, the Committee identified the need for a **more consistent approach** to concussion management across sporting codes and between sporting organisations and educational institutions.

5. For example, IRFU Return to Play guidelines differ markedly from GAA guidelines. In addition, although individual schools have policies on sports-related concussion, these are developed on an ad hoc basis and lack consistency.

6. In order to address such issues, the Committee recommends that the Government consider establishing a Taskforce on Sports Concussion to implement the recommendations of this Report.

7. This Task Force should include representatives from the medical community; the National Rehabilitation Hospital, Acquired Brain Injury Ireland and Headway Ireland; the Departments of Health, Children and Youth Affairs, Education and Skills, representatives from key sporting codes, and nominees from Comhairle na n-Óg.

8. The Taskforce should:
   - consider what measures should be taken by the IRFU / GAA / FAI and other disciplines to develop a joint educational and awareness programme to improve awareness of sports-related concussion;
   - devise standard guidance on concussion diagnosis and Return to Play protocols for dissemination to players, parents, coaches, medics, schools and sporting organisations;
   - make recommendations on rule changes in specific sporting disciplines in order to minimise the impact of sports-related concussion. For example, the Taskforce should consider measures to relax rules on substitution for concussed players.
9. A number of stakeholders stress that helmets do not protect against concussion. Some have recommended that helmets be banned from certain sports as they provide a false sense of security and may even cause further damage to the neck. Notwithstanding the recognised need for helmets and other protective headgear in certain sports including in the game of hurling where it is obligatory to wear one, the Taskforce should make recommendations on this issue, based on up-to-date medical advice.

10. As part of their overall management, it is recommended that all athletes diagnosed with concussion should have a clinical neurological assessment. However, the Committee recognises that access to neurologists or neuropsychologists can be difficult.

11. Concussion clinics should be more readily available and GP awareness of these clinics needs to be increased.

12. Concussion in children and younger people should also be managed differently, with a longer period of rest from sports and other activities, such as homework and computer games etc. The Taskforce should examine what actions are needed to standardise Return to Play advice for children and young people across the public / private education system and across sporting codes.

13. The Committee strongly recommends the compulsory recording of sports-related concussion incidents in schools and sporting activities involving children, in line with Health and Safety and Child Safety standards. The Sports and Concussion Taskforce should examine how this can practically be achieved.

14. State funding for sporting organisations should be linked to the completion of sports concussion training courses for referees, medical professionals and coaches.
1. Introduction

The Joint Committee on Health and Children invited stakeholders to make submissions and/or presentations to the Committee on the issue of concussion in Irish sports. The Committee sought to increase awareness of the seriousness and prevalence of this brain injury, and measures that could be taken to prevent it.

In addition to its public hearings, the Committee received written submissions from sixteen stakeholders and held meetings on 2nd October and 9th October 2014 to discuss the issue. This report will:

- examine the facts and figures around sports-related concussion in Ireland;
- look at the assessment, diagnosis and management of concussion in sport;
- identify the key issues that arose during the Joint Committee’s meetings on the 2nd and 9th October, as well as from secondary research, and;
- make a number of recommendations for consideration by the Oireachtas, and by the Minister for Health.

The Committee’s work is timely given a number of high profile incidents of concussion, such as occurred in the 2014 FIFA World Cup final and the 2013 All Ireland football final, in international and schoolboy rugby matches, as well as several international reports on the subject.

The US National Football League (NFL) has been at the centre of recent litigation cases involving former players who accuse the NFL of negligence, fraud, wrongful death and civil conspiracy.¹ This has spurred the NFL and the academic community to investigate the incidence of concussion and look at how the sport could be made safer. In 2009, the US State of Washington passed the first concussion in sports law, called the Zackery Lystedt Law and from 2009-2013 all 50 states, and the District of Columbia, passed laws on concussions in sports for youth and/or high school athletes.² In 2013 the TV station PBS aired a two hour Frontline investigative documentary entitled League of Denial: The NFL’s Concussion Crisis.³

¹ http://www.washingtonpost.com/sports/redskins/nfl-head-trauma-lawsuits-may-provide-fuel-to-those-questioning-safety-of-game/2012/06/06/qJQAQtoJV_story.html
² http://www.cdc.gov/concussion/policies.html
³ The documentary can be accessed at this link: http://video.pbs.org/video/2365093675/
On the 30th October 2013, the Institute of Medicine (IOM), along with the US National Research Council published a comprehensive report, *Sports-Related Concussions in Youth: Improving the Science, Changing the Culture,*\(^4\) which makes a number of recommendations aimed at research funding agencies, legislatures, state and school superintendents and athletic directors, military organizations, and equipment manufacturers, as well as youth who participate in sports and their parents.

The IOM’s (2013) report finds that:

> “…much remains unknown about the extent of concussions in youth; how to diagnose, manage, and prevent concussions; and the short- and long-term consequences of concussions as well as repetitive head impacts…”

In October 2012 Brain Injury Australia published a policy paper entitled *Concussion in Sport* which made a number of recommendations to improve players’ safety.

Closer to home, the dangers associated with concussion in sport have been highlighted by several medical and sporting bodies, many of whom made presentations to the Committee.

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2. Sports-related concussion in Ireland: facts and figures

This section will provide some information on the incidence of sports-related concussion in Ireland. Most of the statistics in this section were provided to the Committee by stakeholders. However, it should be noted that there is no comprehensive data available on this issue. As a result, many concussions go unreported, which is a source of concern.

Speaking to the Committee on 2\textsuperscript{nd} October 2014, Professor John Ryan, Emergency Consultant at St Vincent’s University Hospital, Dublin stated there was a \textbf{41\% increase in the number of 14 to 18-year-olds reporting to this hospital with head injuries} between the 2012/13 and 2013/14 sporting seasons.

Although Professor Ryan largely attributes this to a growing awareness among players, coaches and parents, of the risks posed by concussion: nevertheless, the overall number of recorded incidents appears to have increased.

Acquired Brain Injury (ABI) Ireland carried out a survey in partnership with the Gaelic Players Association (GPA) which highlights some issues of concern.

The survey, which included a sample of 150 GAA players, found that:
Acquired Brain Injury (ABI) Ireland survey in partnership with the Gaelic Players Association (GPA)

- 54% of those surveyed said they have been concussed while playing;

- 44% of those who said “Yes”, admitted they have been concussed more than once, with between 2-5 times being the common figure;

- 58% continued to play with a concussion, while 42% admitted to returning to play before being symptom free;

- 73% reported that they were assessed by a medical practitioner;

- Most players reported suffering a number of symptoms at once, after being concussed. Dizziness, Headaches, Blurry Vision and Confusion were most commonly reported;

- 42% of those who suffered a concussion reported that they didn’t remember the rest of the game; and

- 56% returned to play between 1-7 days, 17% between 7-14 days and 27% between 1 hour and 1 day.
The GAA also maintains its own injury database since 2006. The database monitors injury data collected from the senior Inter-County playing population. In November 2013, the GAA released a report which examined its database and found that:5

“Only a very small number of injuries 2.3% (Football) and 2.2% (Hurling) have been injuries to the head with less than 1%, (0.8% Football, 0.5%, Hurling) of all injuries being diagnosed as concussion.”

According to the Football Association of Ireland (FAI), concussion is a relatively uncommon injury in football. The FAI cite a recent study from the Clinical Journal of Sports Medicine 2013,6 which included 26 Professional European Teams involving 1,401 players between 2001/2002 and 2009/2010. The study found that head and neck injuries were relatively uncommon in professional soccer. Specifically it found that:

- the head and neck injury rate was 0.17 (0.06 concussions) per 1000 hours;
- head and neck injuries accounted for 2.2% of all injuries;
- there was a 20-fold higher rate of head and neck injury during match play compared with training;
- average rest period after concussion was 10.5 days, but 27% of the concussed players returned to play within 5 days; and
- defenders were at most risk of concussion.

Data on the incidence of concussion in horse racing was provided to the Committee by Dr. Adrian McGoldrick, Senior Medical Officer at Irish Turf Club. The injuries, including concussion, from 2008-2013 are included in Figure 1.

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6 [http://journals.lww.com/cjsportsmed/Abstract/2013/07000/Head_and_Neck_Injuries_in_Professional_Soccer_2.aspx](http://journals.lww.com/cjsportsmed/Abstract/2013/07000/Head_and_Neck_Injuries_in_Professional_Soccer_2.aspx)
Figure 1: Concussion in Irish Horse Racing 2008-2013

<table>
<thead>
<tr>
<th>Year</th>
<th>Injuries</th>
<th>Concussions</th>
<th>Concussion as a percentage of injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>284</td>
<td>29</td>
<td>10.2</td>
</tr>
<tr>
<td>2009</td>
<td>264</td>
<td>48</td>
<td>18.2</td>
</tr>
<tr>
<td>2010</td>
<td>376</td>
<td>32</td>
<td>8.5</td>
</tr>
<tr>
<td>2011</td>
<td>344</td>
<td>29</td>
<td>8.4</td>
</tr>
<tr>
<td>2012</td>
<td>217</td>
<td>16</td>
<td>7.4</td>
</tr>
<tr>
<td>2013</td>
<td>273</td>
<td>15</td>
<td>5.5</td>
</tr>
</tbody>
</table>

Source: Dr. Adrian McGoldrick, Senior Medical Officer, Irish Turf Club
Table 1 compares the incidence of concussion in horse racing in Ireland with horse racing in the UK. The table shows that the incidence of concussion per ride is the same in Ireland as it is in the UK (0.086). This data would indicate that concussion in horse racing, while low, accounts for a higher proportion of injuries than in sports such as GAA or soccer.

Table 1: Comparative data

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of rides</th>
<th>Number of concussions</th>
<th>Concussions per ride</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.K.</td>
<td>1,904,400</td>
<td>1,635</td>
<td>0.086</td>
</tr>
<tr>
<td>Ireland</td>
<td>267,638</td>
<td>231</td>
<td>0.086</td>
</tr>
</tbody>
</table>

Source: Dr. Adrian Mc Goldrick, Senior Medical Officer, Irish Turf Club

In professional international rugby players are getting heavier and faster, and significantly the number of tackles per game is increasing. According to the International Rugby Board (IRB), over the past 15 years there has been, on average, a 10% increase in player weight across positions and a 5% drop in the average time for the 10m sprint. In the same period of time the average number of tackles has risen from 160 to 220 per match.\(^7\) These trends highlight the need to prioritise risk management around sports and concussion.

Research in English rugby has also shown that head injuries account for about 25% of injuries during play. Studies in professional rugby have shown that concussion occurs at a rate of about 3.9 per 1000 player hours (i.e. 1 in every 6 games amongst all the players involved) whereas studies at amateur adult level suggest that it occurs at a rate of 1.2 per 1000 player hours (i.e. 1 in every 21 games).\(^8\)

Table 2 compares concussion rates across various sports. The table shows that horse racing has the highest rate of concussion, followed by boxing, with professional rugby and Australian football a close third and fourth.

\(^7\) [http://www.theguardian.com/sport/2013/dec/14/rugby-union-concussion-medical-experts](http://www.theguardian.com/sport/2013/dec/14/rugby-union-concussion-medical-experts)

Table 2: Comparative concussion rates

<table>
<thead>
<tr>
<th>Sport</th>
<th>Concussion rate per 1000 player hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horse racing (Amateur)</td>
<td>95.2</td>
</tr>
<tr>
<td>Horse racing (Jumps)</td>
<td>25</td>
</tr>
<tr>
<td>Horse racing (Flat)</td>
<td>17.1</td>
</tr>
<tr>
<td>Boxing (professional)</td>
<td>13.2</td>
</tr>
<tr>
<td>Australian football (professional)</td>
<td>4.2</td>
</tr>
<tr>
<td>Rugby union (professional)</td>
<td>3.9</td>
</tr>
<tr>
<td>Ice Hockey (NHL)</td>
<td>1.5</td>
</tr>
<tr>
<td>Rugby union (amateur)</td>
<td>1.2</td>
</tr>
<tr>
<td>Soccer football (FIFA)</td>
<td>0.4</td>
</tr>
<tr>
<td>NFL football (NFL)</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Source: 2012 Sports Concussion Consensus Conference, as cited by the RFU 2014

Conclusion:

While the incidence of concussion in sport may be relatively low, the effects of this injury can be very serious if not properly managed. The next section looks at the assessment, diagnosis and management of concussion.
3. Assessment, diagnosis and management of concussion in sport

3.1 Symptoms of concussion

Speaking to the Committee on 9th October 2014, Dr. Sean Moffatt, a GAA team doctor, described concussion as:

“…a complex pathophysiological process in which forces are transmitted to the brain and result in temporary impairment of brain function.”

The symptoms, as described by Dr. Moffatt, include dizziness, headaches, drowsiness, confusion, irritability, noise and light sensitivity and sometimes lack of consciousness; these symptoms normally resolve after 24 to 48 hours. Other symptoms attributed to concussion include sleep disturbance and depression. Less than 10% of concussions are associated with a loss of consciousness.9

The impact causing concussion can be received on the head, face, neck or elsewhere on the body. The onset of concussion is usually rapid but it may also evolve over a number of hours.10

On 2nd October 2014, Dr. Michael Farrell, a brain pathologist at Beaumont Hospital, told the Committee that some people are prone to concussion, while others are never concussed. In terms of long-term effects, concussion has been associated with Chronic Traumatic Encephalopathy (CTE), a progressive degenerative disease of the brain, reported in some athletes who have suffered repetitive brain trauma e.g. boxers or those in the NFL.11 However, a causal relationship has not yet been determined between concussion and CTE.12

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9 This statistic was provided by ABI Ireland through their written submission to the Committee.
10 Zurich Consensus statement on concussion in sport. Accessed on 15th October 2012 at http://bjsm.bmj.com/content/47/5/250.full
11 Boston University. See http://www.bu.edu/cte/about/what-is-cte/
12 Zurich Consensus statement on concussion in sport. Accessed on 15th October 2012 at http://bjsm.bmj.com/content/47/5/250.full
Recently, Professor Damian Bailey carried out research on 280 current and retired rugby players. His report has not yet been published but he told the BBC that there were two main findings:\(^{13}\)

- In younger players repetitive concussions can have a negative impact on the way the brain functions - in terms of how it regulates blood flow to itself.

- In retired players that have played at the very top end of the game - repetitive concussions can impair the way these players remember and formulate ideas, so it accelerates brain ageing and potentially increases susceptibility to early onset dementia.

### 3.2 Management of concussion

The Zurich 2012 consensus statement on concussion in sport was developed for use by physicians and healthcare professional involved in caring for injured athletes at all levels.\(^ {14}\) The Zurich statement is significant as its guidelines inform the approach taken by a number of sporting bodies across the world, including Ireland. It is a cornerstone guideline and contains the most up-to-date thinking on the treatment and management of concussion. The Zurich statement advises that:

> “The cornerstone of concussion management is physical and cognitive rest until the acute symptoms resolve…”

#### Sideline assessments

Concussion may be diagnosed with the help of the Sport Concussion Assessment Tool (SCAT3)\(^ {15}\) in the case of those over the age of 13, or the CHILD-SCAT3 for children aged 5-12 years. These tools are designed for use by qualified first responders and medical professionals.\(^ {16}\) Those not qualified to use SCAT3 are encouraged to use the Concussion Recognition Tool.\(^ {17}\) However, it is not recommended that a diagnosis should be made using these tools in the absence of a clinician, as an athlete may have both concussion and a normal SCAT3 score.\(^ {18}\)

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\(^{14}\) The Zurich 2012 guidelines can be accessed at this link [http://bjsm.bmj.com/content/47/5/250.full](http://bjsm.bmj.com/content/47/5/250.full)

\(^{15}\) SCAT3 Sport Concussion Assessment Tool. Accessed on October 15\(^ {th}\) 2014 at [http://bjsm.bmj.com/content/47/5/259.full.pdf](http://bjsm.bmj.com/content/47/5/259.full.pdf)

\(^{16}\) [http://www.sportconcussionlibrary.com/content/sport-concussion-assessment-tool-3-scat3](http://www.sportconcussionlibrary.com/content/sport-concussion-assessment-tool-3-scat3)

\(^{17}\) Pocket Concussion Recognition Tool is available at this link [http://www.sportsclinic.ca/resources/TSC-SCAT3-Assessment.pdf](http://www.sportsclinic.ca/resources/TSC-SCAT3-Assessment.pdf)

\(^{18}\) [http://www.sportconcussionlibrary.com/content/sport-concussion-assessment-tool-3-scat3](http://www.sportconcussionlibrary.com/content/sport-concussion-assessment-tool-3-scat3)
The International Rugby Board (IRB) introduced the Pitch-Side Concussion Assessment (PSCA) at elite level, on a pilot basis in 2012, after a working group met to improve the standard of pitch-side assessment.\textsuperscript{19} However, concerns have been expressed that this five minute assessment will not pick up all concussions as symptoms can evolve over time. The danger is that a player who passes the PSCA will return to play and be at risk from a second impact.\textsuperscript{20}

A recent study published in the \textit{British Journal of Sports Medicine}\textsuperscript{21} found that the introduction of the PSCA resulted in a significant reduction in the number of players (who were later determined to have sustained a concussion) returning to play that day. The study also found that the tool correlated well with subsequent clinical assessment. However, speaking about the PSCA, Dr. Barry O’Driscoll said that any player showing symptoms of concussion should leave the pitch immediately, \textit{regardless} of the PSCA.\textsuperscript{22}

\textbf{Neurological and neuropsychological assessment}

It is generally recommended that all athletes diagnosed with concussion should have a clinical neurological assessment as part of their overall management. This is normally to be performed by the treating physician and often in conjunction with computerised neuropsychological screening tools.\textsuperscript{23}

The Zurich 2012 guidelines do not consider formal neuropsychological (NP) testing to be required in every case. A recent study also found that there was not enough evidence to recommend the widespread routine use of baseline NP.\textsuperscript{24} However, the Zurich guidelines note that where NP testing is carried out, it may provide important information in the early stages after an injury.

The Zurich 2012 guidelines do not draw a distinction between elite and non-elite players when it comes to the management of concussion. They read:

\begin{itemize}
  \item \textsuperscript{20} http://www.theguardian.com/sport/2013/dec/14/rugby-union-concussion-medical-experts
  \item \textsuperscript{21} http://www.theguardian.com/sport/2013/dec/14/rugby-union-concussion-medical-experts
  \item \textsuperscript{22} http://www.thejournal.com/sport/2013/dec/14/rugby-union-concussion-medical-experts
  \item \textsuperscript{23} Zurich Consensus statement on concussion in sport. Accessed on 15\textsuperscript{th} October 2012 at http://bjsm.bmj.com/content/47/5/250.full
\end{itemize}
“Although formal NP testing may be beyond the resources of many sports or individuals, it is recommended that, in all organised high-risk sports, consideration be given to having this cognitive evaluation, regardless of the age or level of performance.”

Return to play (RTP)

Returning to play while concussed puts the player at serious risk as a second impact may prove fatal. As described by the Mayo Clinic:25

“Experiencing a second concussion before signs and symptoms of a first concussion have resolved may result in rapid and usually fatal brain swelling.”

The American Medical Society for Sports Medicine also highlights the danger of receiving a second blow to the head:

“Animal and human studies support the concept of post concussive vulnerability, showing that a second blow before the brain has recovered results in worsening metabolic changes within the cell.”

Furthermore, the American Medical Society for Sports Medicine refers to evidence which suggests that if a person who has suffered the concussion returns to cognitive or physical activity before they fully recover, the brain may be vulnerable to prolonged dysfunction.26

The Zurich 2012 guidelines state that no player experiencing concussion should return to play that day. Instead the guidelines recommend:

“…a graded programme of exertion prior to medical clearance and RTP.”

The graded approach to RTP, from the Zurich document, is outlined in Table 3.

25 http://www.mayoclinic.org/diseases-conditions/concussion/basics/complications/con-20019272
26 Clin J Sport Med 2013;23:1–18
### Table 3: Graduated return to play protocol

<table>
<thead>
<tr>
<th>Rehabilitation stage</th>
<th>Functional exercise at each stage of rehabilitation</th>
<th>Objective of each stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. No activity</td>
<td>Symptom limited physical and cognitive rest</td>
<td>Recovery</td>
</tr>
<tr>
<td>2. Light aerobic exercise</td>
<td>Walking, swimming or stationary cycling keeping intensity &lt;70% maximum permitted heart rate No resistance training</td>
<td>Increase HR</td>
</tr>
<tr>
<td>3. Sport-specific exercise</td>
<td>Skating drills in ice hockey, running drills in soccer. No head impact activities</td>
<td>Add movement</td>
</tr>
<tr>
<td>4. Non-contact training drills</td>
<td>Progression to more complex training drills, eg, passing drills in football and ice hockey May start progressive resistance training</td>
<td>Exercise, coordination and cognitive load</td>
</tr>
<tr>
<td>5. Full-contact practice</td>
<td>Following medical clearance participate in normal training activities</td>
<td>Restore confidence and assess functional skills by coaching staff</td>
</tr>
<tr>
<td>6. Return to play</td>
<td>Normal game play</td>
<td></td>
</tr>
</tbody>
</table>

Source: Zurich 2012 Consensus statement on concussion in sport

Brain Injury Australia’s (2012) report references the AFL Medical Officers’ Association Guidelines which concede that:

“…return to play…decisions remain difficult…Currently, however there is no single gold standard measure of brain disturbance and recovery following concussion. Instead, clinicians must rely on indirect measures to inform clinical judgment. In practical terms, this involves a multifaceted clinical approach, which includes assessment of symptoms, signs (such as balance) and cognitive function.”

The Zurich 2012 statement on concussion states that in the absence of neuropsychological testing a more conservative approach to RTP may be appropriate (see section 4.2 for more on neuropsychological testing and resources).

Various sports bodies outlined their RTP policies to the Committee; for instance the IRFU said that they are very much guided by the Zurich 2012 guidelines and that any player with concussion symptoms cannot return to play that day.
Similarly, the GAA told the Committee:

“With regard to return to play, the cornerstone of concussion management is physical and cognitive rest until the acute symptoms resolve.”

The International Amateur Boxing Association (IABA) told the Committee on 9th October 2014 that if a boxer gets knocked out or receives heavy blows to the head, to the extent that the fight is stopped, then the boxer will not be allowed to fight or spar for a period of at least 30 days.

Horse Sport Ireland’s written submission to the Committee states that a competitor who has sustained a concussion will have a mandatory suspension for 21 days, which may be amended to 10 days if he/she is asymptomatic and certified fit by a qualified medical practitioner. Suspensions are recorded in a rider’s medical arm band and repeated episodes of concussion must be reviewed by a consultant neurologist.
4. Key issues

This section looks at key issues which have been identified through a review of academic reports, transcripts from the Joint Committee’s meetings and stakeholder submissions.

4.1 A lack of research and data

A number of stakeholders identified a lack of baseline data on the incidence of concussion in Ireland as a key barrier to progress. Professor John Ryan, consultant in emergency medicine in St. Vincent’s University Hospital and team doctor with the Leinster rugby team, speaking to the Committee on 2nd October 2014, said:

“We need to improve our awareness of the incidence and try to get some statistical evaluation of increases and decreases in particular sports and an understanding of the mechanisms involved."

Dr. Michael Farrell, a brain pathologist at Beaumont Hospital, also speaking to the Committee on 2nd October 2014, espoused the need for more longitudinal data:

“There have been no prospective longitudinal studies conducted on players with established baselines before they become concussed and examined afterwards with a variety of different biomarkers and followed long enough to see whether they develop this condition.”

Dr. Éanna Falvey, director of Sports and Exercise Medicine at the Sports Surgery Clinic also expressed a need for research to establish biomarkers that may be better able to detect injury to cells in the brain. For instance, Tau protein may be used as a biomarker for CTE, but it is also a natural protein which is seen in aging and so, without longitudinal research or baseline data on players, it is impossible to say if the presence of this biomarker is a result of natural process or brain trauma.

Dr. Falvey recommended that international collaboration take place and that data be pooled to accelerate such studies.

The GAA, in its written submission to the Committee, recommends additional research to validate current assessment tools, to assess the role of baseline testing and improve identification of those at risk of prolonged post-concussive symptoms or other long-term complications.
The American Medical Society for Sports Medicine issued a statement in 2013\textsuperscript{27} which recommended two directions for the future. These were:

- Additional research is needed to validate current assessment tools, delineate the role of neuropsychological testing, and improve identification of those at risk of prolonged post-concussive symptoms or other long-term complications.
- Evolving technologies for the diagnosis of concussion, such as newer neuro-imaging techniques or biological markers, may provide new insights into the evaluation and management of sports concussion.

### 4.2 Resources for dealing with concussion

Several stakeholders highlight a lack of resources to deal with cases of concussion and suspected concussion. Acquired Brain Injury Ireland’s written submission to the Committee notes that:

“At present there are no concussion specialist services in Ireland that a person can be referred to following a severe concussion, should they be in need further assessment and monitoring.”

Dr. Sean Moffatt stated that there is a lack of neurologists in Ireland and that, as a team doctor and GP, he is reliant on favours, personal connections and the private health sector to have players examined. Dr. Alan Byrne, Irish senior soccer team medical specialist with the FAI, also said that access to neurologists or neuropsychologists is challenging, particularly for those who do not have financial resources.

Dr. Éanna Falvey expressed the need for concussion clinics where patients could be diagnosed and rehabilitated. Speaking to the Committee on 2\textsuperscript{nd} October 2014, Ms. Barbara O’Connell of ABI told the Committee that currently, such clinics are not readily available and GP awareness is not there.

Ms O’Connell said that ABI can and do provide neuro-rehabilitation and that they would be prepared:

“…to take a leadership role in assisting the Department of Health…We deal with all of the sporting bodies…We have been very successful in bringing everybody together and in pulling together the expertise.”

However, Ms O’Connell also said that ABI needs to be resourced properly so that it can carry out its work. She said that ABI has had to engage in fundraising with sponsorship from

\textsuperscript{27} Clin J Sport Med 2013;23:1–18
private companies such as Coca Cola and Covidien for specific initiatives that they have taken to promote awareness of concussion.

4.3 Groups at particular risk from concussion

This section looks at groups in which concussion may be particularly dangerous: younger players, non-elite players and females.

4.3.1 Concussion among younger players

The Zurich 2012 guidelines include children and adolescents in their ‘special populations.’ This is because children report concussion symptoms differently from adults and therefore require a different checklist to detect concussion, along with a different approach to treatment.

Speaking to the Committee on 2nd October 2014, Professor Michael Molloy said that children suffering from concussion:

“...should be kept out of school, not allowed to play games on their telephones and allowed to rest. This is taken very seriously in most countries, particularly in the US. Children must be evaluated slowly and it must be remembered that they take longer to recover. They are at a greater risk than adults because frequently they bleed from the injury.”

4.3.2 Concussion among non-elite players

Several stakeholders expressed the view that non-elite players are at greater risk, due to a lack of access to medical or professional help. For instance, Professor Michael Molloy, speaking to the Committee on 2nd October 2014 said:

“Players go through a very rigorous, careful evaluation before they are allowed back to play. Before they go back, however, they must be given medical clearance. This is quite easy to manage in professional sport but with amateur sport it is a major headache.”

Highlighting a similar point, Professor John Ryan on the 2nd October 2014 said that:

“We must realise that the majority of people getting head injuries in sport occur among a group of weekend warriors and school children for which this country does not have the capacity to provide a medic or even a paramedic or an allied health carer.”

Dr. Adrian McGoldrick said that most concussions in equestrian sports take place in the recreational area. He also said that, for insurance purposes, GPs cannot simply turn up to oversee a GAA match or race meeting. In the case of horse racing, doctors must take a one-
day course every three years. In considering policy changes in this area, Dr. McGoldrick urged that there:

“…be a balance between what is appropriate and what is feasible.”

4.3.3 Concussion among females

While the Zurich 2012 consensus statement on concussion does not include females in their ‘special populations’, there is some evidence that females are at greater risk from concussions. Brain Injury Australia’s (2012) report includes an overview of such evidence:

“A recent Australian meta-analysis of 78 research papers “describing 92 independent samples of sports-related concussion” found “female athletes were, on average, more adversely affected by concussion than male athletes.”

Brain Injury Australia (2012) observes that, generally, there is a dearth of studies on concussion among females in contact sports.

The Zurich 2012 guidelines conclude that:

“There was no unanimous agreement that the current published research evidence is conclusive enough for this to be included as a modifying factor, although it was accepted that gender may be a risk factor for injury and/or influence injury severity.”
4.4 Use of helmets and other protective headgear

During its deliberations, the Committee was advised by some stakeholders that helmets and scrum caps were not effective in protecting against concussion and, in certain sports, may do more harm than good. Professor John Ryan said:

“In some sports the weight of a heavier helmet may put an abnormal torque on the neck and even put the neck at risk.”

Professor Michael Molloy speaking about helmets in sports says:

“It does not protect one but gives a false sense of security and for children in particular, it should be outlawed.”

A similar consensus view has been reached in boxing. On the 9th October 2014 Dr. Joe McKeever told the Committee that the International Boxing Association decided in 2013 to remove headgear from all forms of men’s elite senior boxing. The decision was based on two studies which showed that removal should decrease concussions. However, women will continue to wear headgear in this sport. According to the AIBA website, women suffer injury and concussion less commonly than men and concludes that women’s Olympic style boxing is safer than men’s.

4.5 Awareness and education

ABI Ireland has engaged in a variety of brain injury awareness campaigns, including concussion in sport. These campaigns include:

1. Education Poster campaign
2. Securing Campaign ambassadors
3. Online Video campaign
4. Research – GAA players
5. Concussion Cards for Coaches and Players
7. Concussion Workshop/Talks
8. Concussion App for smartphones

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28 One study by the AIBA Medical Commission (more than 2,000 bouts studied) and a study published by an independent physician-researcher in a recent publication in the British Journal of Sports Medicine (almost 30,000 bouts reviewed over the past 59 years).
The Committee noted that Headway Ireland was also involved in awareness, education and programmes relating to brain injuries.

The GAA recommend that a Task Force be established to devise an educational programme to improve awareness of sports-related concussion. Specifically, the GAA recommend that a Task Force:

- Review successful public health campaigns in countries such as Canada and the United States.
- Plan and implement a national awareness campaign, including a targeted awareness campaign in primary and post-primary schools for pupils, parents and teachers.
- Develop educational resources such as online training courses, educational videos and information leaflets.

The Irish Rugby Union Players’ Association (IRUPA) refer to the International Rugby Board (IRB) Player Welfare website, which has a ‘Learn Online’ concussion management tool for medically trained visitors who can enter the inter-active learning modules at various stages, i.e. stages aimed at concussion management for (i) doctors; (ii) match day medical staff; and (iii) elite match day medical staff. There is also a module available for the general public to access.

On the 2nd October 2014, Professor John Ryan told the Committee:

“Parents, players, coaches, managers and, increasingly, junior and emergency medicine doctors are becoming aware of concussion, of its significance and the need to deal with it.”

While awareness of concussion does not necessarily translate into best practice when it comes to management of symptoms and decisions on return to play, increasing public awareness may be a first step in a change of attitudes towards sports-related brain injury.

31 http://www.irbplayerwelfare.com/
Conclusion

This Report highlights the Oireachtas Committee’s key findings and concerns on the issue of concussion in sports. In general, although the Committee identified areas where best practice was being applied, this was particularly at the professional level. We identified significant gaps in terms of guidance, advice and policy implementation both at amateur and school level.

Although a number of stakeholders have carried out a considerable amount of work to raise awareness of concussion in sport, the Committee identified areas where advice and guidance needs to be more consistent across sporting disciplines, with a greater focus on enforcement and implementation at ground level.

Experts have invested significant energy in raising awareness of sports concussion in developing best practice in this area. However, given the limited resources available, the Committee identified further scope for collaboration so that sports concussion incidents can be reduced.
5. Useful references

internal/de5fs23hu73ds/progress?id=4w1u8L9mKMLadNQIPG84fr6T89M8HebOtfl1MOu7HbE,


IRFU concussion poster:

IRFU Submission to Oireachtas Health and Children Committee hearings:


Section 2: Those who made presentations to the Committee

Professor Michael Molloy - Consultant Rheumatologist, Chair of the Concussion Advisory Group at the Faculty of Sports and Exercise Medicine, Royal College of Surgeons in Ireland and Royal College of Physicians of Ireland, and former Irish rugby international.

Dr. Padraig Sheeran - Dean of the Faculty of Sports and Exercise Medicine, Royal College of Surgeons in Ireland, and Royal College of Physicians of Ireland.

Dr. Michael Farrell - Consultant Neuropathologist, Beaumont Hospital.

Professor John Ryan - Consultant in Emergency Medicine, St Vincent's University Hospital.

Dr. Éanna Falvey - Director of Sports and Exercise Medicine, Sports Surgery Clinic.

Ms. Barbara O'Connell - CEO, Acquired Brain Injury Ireland.

Ms. Karen O'Boyle - Communications Manager, Acquired Brain Injury Ireland.

Mr. Michael Darragh Macauley – Acquired Brain Injury Ireland Champion.

Dr. Alan Byrne - Irish Senior Soccer Team Medical Specialist, FAI.

Mr. Ruud Dokter - High Performance Director, FAI.

Dr. Adrian McGoldrick - Senior Medical Officer, The Turf Club and Irish Jockeys Association.

Dr. Sean Moffat - Technical Advisor on Medical Matters, GAA.

Mr. Ger Ryan - Chairman of the Medical Scientific and Welfare Committee, GAA.

Dr. Rod McLoughlin – IRFU Head of Medical Services, IRFU.

Mr. Omar Hassaniien - Chief Executive, Irish Rugby Union Players' Association.

Dr. Joe McKeever - Medical Advisor, Irish Amateur Boxing Association.

Dr. Mary Flannery - Honorary Medical Officer, Horse Sport Ireland.

Dr. Tony Holohan - Chief Medical Officer, Department of Health.

Dr. Miriam Owens - Health and Wellbeing Programme, Department of Health.

Mr. Ronan Toomey - Health and Wellbeing Programme, Department of Health.

Dr. Tony Gaynor - Curriculum and Assessment Policy Unit, Department of Education and Skills.

Mr. Seanie McGrath - Inspectorate Unit, Department of Education and Skills.
Written Submissions Received from:
Education Sports Trust
Dr. Willie Stewart
Mr. Cliff Beirne

Section 3: Hyperlinks to transcripts of Meetings

Link to transcript of the meetings of 2nd October 2014
Link to transcript of the meetings of 9th October 2014

Also view online at www.oireachtas.ie
Section 4: Terms of Reference

ORDERS OF REFERENCE

a. Functions of the Committee – derived from Standing Orders [DSO 82A; SSO 70A]

(1) The Select Committee shall consider and report to the Dáil on—

(a) such aspects of the expenditure, administration and policy of the relevant Government Department or Departments and associated public bodies as the Committee may select, and

(b) European Union matters within the remit of the relevant Department or Departments.

(2) The Select Committee may be joined with a Select Committee appointed by Seanad Éireann to form a Joint Committee for the purposes of the functions set out below, other than at paragraph (3), and to report thereon to both Houses of the Oireachtas.

(3) Without prejudice to the generality of paragraph (1), the Select Committee shall consider, in respect of the relevant Department or Departments, such—

(a) Bills,

(b) proposals contained in any motion, including any motion within the meaning of Standing Order 164,

(c) Estimates for Public Services, and

(d) other matters

as shall be referred to the Select Committee by the Dáil, and

(e) Annual Output Statements, and

(f) such Value for Money and Policy Reviews as the Select Committee may select.

(4) The Joint Committee may consider the following matters in respect of the relevant Department or Departments and associated public bodies, and report thereon to both Houses of the Oireachtas:

(a) matters of policy for which the Minister is officially responsible,

(b) public affairs administered by the Department,

(c) policy issues arising from Value for Money and Policy Reviews conducted or commissioned by the Department,

(d) Government policy in respect of bodies under the aegis of the Department,

(e) policy issues concerning bodies which are partly or wholly funded by the State or which are established or appointed by a member of the Government or the Oireachtas,

(f) the general scheme or draft heads of any Bill published by the Minister,
(g) statutory instruments, including those laid or laid in draft before either House or both Houses and those made under the European Communities Acts 1972 to 2009,

(h) strategy statements laid before either or both Houses of the Oireachtas pursuant to the Public Service Management Act 1997,

(i) annual reports or annual reports and accounts, required by law, and laid before either or both Houses of the Oireachtas, of the Department or bodies referred to in paragraph (4)(d) and (e) and the overall operational results, statements of strategy and corporate plans of such bodies, and

(j) such other matters as may be referred to it by the Dáil and/or Seanad from time to time.

(5) Without prejudice to the generality of paragraph (1), the Joint Committee shall consider, in respect of the relevant Department or Departments—

(a) EU draft legislative acts standing referred to the Select Committee under Standing Order 105, including the compliance of such acts with the principle of subsidiarity,

(b) other proposals for EU legislation and related policy issues, including programmes and guidelines prepared by the European Commission as a basis of possible legislative action,

(c) non-legislative documents published by any EU institution in relation to EU policy matters, and

(d) matters listed for consideration on the agenda for meetings of the relevant EU Council of Ministers and the outcome of such meetings.

(6) A sub-Committee stands established in respect of each Department within the remit of the Select Committee to consider the matters outlined in paragraph (3), and the following arrangements apply to such sub-Committees:

(a) the matters outlined in paragraph (3) which require referral to the Select Committee by the Dáil may be referred directly to such sub-Committees, and

(b) each such sub-Committee has the powers defined in Standing Order 83(1) and (2) and may report directly to the Dáil, including by way of Message under Standing Order 87.

(7) The Chairman of the Joint Committee, who shall be a member of Dáil Éireann, shall also be the Chairman of the Select Committee and of any sub-Committee or Committees standing established in respect of the Select Committee.

(8) The following may attend meetings of the Select or Joint Committee, for the purposes of the functions set out in paragraph (5) and may take part in proceedings without having a right to vote or to move motions and amendments:

(a) Members of the European Parliament elected from constituencies in Ireland, including Northern Ireland,

(b) Members of the Irish delegation to the Parliamentary Assembly of the Council of Europe, and

(c) at the invitation of the Committee, other Members of the European Parliament.
b. Scope and Context of Activities of Committees (as derived from Standing Orders [DSO 82; SSO 70]

(1) The Joint Committee may only consider such matters, engage in such activities, exercise such powers and discharge such functions as are specifically authorised under its orders of reference and under Standing Orders.

(2) Such matters, activities, powers and functions shall be relevant to, and shall arise only in the context of, the preparation of a report to the Dáil and/or Seanad.

(3) It shall be an instruction to all Select Committees to which Bills are referred that they shall ensure that not more than two Select Committees shall meet to consider a Bill on any given day, unless the Dáil, after due notice given by the Chairman of the Select Committee, waives this instruction on motion made by the Taoiseach pursuant to Dáil Standing Order 26. The Chairmen of Select Committees shall have responsibility for compliance with this instruction.

(4) The Joint Committee shall not consider any matter which is being considered, or of which notice has been given of a proposal to consider, by the Committee of Public Accounts pursuant to Dáil Standing Order 163 and/or the Comptroller and Auditor General (Amendment) Act 1993.

(5) The Joint Committee shall refrain from inquiring into in public session or publishing confidential information regarding any matter if so requested, for stated reasons given in writing, by—

(a) a member of the Government or a Minister of State, or

(b) the principal office-holder of a body under the aegis of a Department or which is partly or wholly funded by the State or established or appointed by a member of the Government or by the Oireachtas:

Provided that the Chairman may appeal any such request made to the Ceann Comhairle / Cathaoirleach whose decision shall be final.