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Review Article

Concussion in the NHL: Where Do We Stand?

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Abstract

While much attention has been directed to concussion in the National Football League, our understanding of concussion trends in the National Hockey League (NHL) remains unsatisfactory. Concussion rates in the NHL have increased in the past decade despite the launch of the 1997 Concussion Program and subsequent rule changes to penalize body-checks to the head. Our understanding of concussion trends may be limited due to an absence of standardization in the reporting and diagnosing of concussion in the NHL. The National Hockey League should establish a universal protocol for team physicians to use when diagnosing concussions and teams should grant medical researchers access to concussion incidence in order to clarify the level of risk that ice hockey imposes on professional skaters.

Keywords:

National hockey league, concussion, professional ice hockey, traumatic brain injury, injury prevention

Abbreviations

National Football League (NFL), National Hockey League (NHL), Chronic Traumatic Encephalopathy (CTE), Sport Concussion Assessment Tool (SCAT)

Hockey players are tough and gritty athletes. Ask any veteran - hockey encourages a "warrior mentality" in which players are respected for masking pain through crashes, body-checks, and fighting. What are the consequences of this hardy style of play? The topic of concussion in the National Football League (NFL) has made headway in the media over the past decade after class-action lawsuits were filed against the concealment of the traumatic effects of NFL head injuries [1]. However, less attention has been addressed to the incidence and long-term consequences of concussion in the National Hockey League (NHL).

In February of 2015, 10-year veteran NHL defenseman Steve Montador was found deceased in his home at the age of 35 years old [2]. A brain autopsy revealed Chronic Traumatic Encephalopathy (CTE), a disease associated with memory loss, dementia, and depression. Steve Montador is likely not alone in this development amongst NHL athletes. Montador was the fifth NHL player to be diagnosed post-mortem with CTE, which supports academic claims that repeat concussion places hockey players at high risk of developing CTE [1,3-5]. Concussion has been defined as a pathophysiological brain response presenting with one or more of the following symptoms: headache, dizziness, vomiting, cognitive dysfunction, gait disturbance, loss of memory, ringing in the ears, blurred vision, fatigue, and irritability [4-6]. The predominant mechanism of concussion is described as a biomechanical force to the head, neck or face in which a shearing force causes rapid compression and deformation of the brain [7,18-20]. As an aggressive sport with player speeds measured as high as 30 kilometers per hour [11], ice hockey has demonstrated the highest concussion rates across contact sports [7,11-12]. Concussion incidence alone accounts for 2-14% of total hockey injuriesacross all ages [7,13-16]. The NHL made its first attempt to monitor concussion rates by launching the Concussion Program in 1997 to diagnose, assess, and track concussion in professional North American hockey [5-7]. Given its persistent impairment to professional careers, publicized primarily among elite players like Sidney Crosby [3], it is worthwhile to question what improvement the NHL has made with concussion.

The 1997 NHL Concussion Program required all NHL teams to submit standardized injury reports to document concussions diagnosed by team physicians [5-7]. A systematic review of seven independent studies reportedreportedan increasing mean number of concussions per NHL hockey season, from 11.6 concussions per season during the 1986-1996 seasons to a range of44 - 97 concussions per season in the 1996-2012 seasons [7]. Since the enactment of the 1997 Concussion Program,NHL concussions have risen from 2.5 of every 100 NHL games in 1997-98 to 4.9 of every 100 NHL games in 2011-12 [5]. Rule 48 was created during the 2010-11 season and made body-checks to the head illegal; however, concussion rates have not decreased since its implementation [5,7,8]. Why might NHL concussion rates be on the rise? Currently, we do not seem to have an answer.

Positive risk factors for concussion have been defined as player fatigue [21], playing the forward position [6], age [21], and an overall increase in athlete size, speed, and strength of NHL players [6]. However, perhaps the greatest challenge in concussion assessment in the NHL is the ambiguity of outcome measurement (i.e. diagnosis) by medical professionals and researchers [7]. With regard to reporting concussion incidence, the NHL has not disclosed concussion data publically under the protection of medical confidentiality [6,7,9]. Since the adoption of the 1997 NHL Concussion Program, only two studies from data collected directly from team physicians have been reported [7]. The first was an abstract by Meeuwisse, Burke and Benson (2003), which released data from the first five years following the program commencement. It reported a mean of 97 concussions/season and a median of two games missed following each concussion [17]. The second study was aprospective case series across the 1997-2004 seasons by Benson et al. in which NHL physicians reported an average of 80 concussions/season with a median of six days lost from play per concussion [6].

As the Concussion Program continues to adapt with new knowledge regarding concussion in contact sports, the NHL should seek to establish a common protocol in the way concussions are both diagnosed and reported. Current methodology of concussion in the NHL may be skewed by player underreporting of their symptoms and inaccurate diagnosis due to broadly defined criteria for concussion [6,7]. The NHL has not developed a standardized concussion diagnosis protocol. Its current definition of concussion includes a broad spectrum of symptoms open to the interpretation of individual team physicians who are under salary of the National Hockey League [6]. The issues regarding concussion reporting and the limited public access to concussion data have created challenges in collecting consistent concussion data. Independent researchers have used a variety of ways to study concussion, ranging from media collection of sport websites such as Roto world or The Hockey News [6,9-10] to reviews of digital videos of game play [8,16]. Standardization of NHL concussion diagnosis and reporting protocol would likely reduce concussion outcome bias due to these discrepancies.

Conclusions

Standardization of NHL concussion diagnosis is recommended, either through a third-party physician or by using established protocol such as the Sport Concussion Assessment Tool (SCAT). Possible solutions include implementing concussion grade scales for team physicians and an NHL concussion database that can be accessed with permission from the NHL for research purposes. These modifications should be considered before making formal changes to the rules of hockey, such as eliminating body-checking or changing the dimensions of ice rinks. These improvements would clarify our understanding of concussion trends in the NHL and help determine whether hockey is becoming more dangerous, or rather has an inherent concussion risk that participants must acknowledge before play.

References

1. Jeffrey GC, Bloom GA (2015) Ethical issues surrounding concussions and player safety in professional ice hockey. Neuroethics 8: 5-13.
2. John B (2015) Steve Montador Had C.T.E.; Family to Sue N.H.L. The New York Times.
3. Johnson LSM (2011) Concussion in youth ice hockey: It's time to break the cycle. Canadian Medical Association Journal 183: 921-924.
4. Caron JG, Bloom GA, Johnston KM, Sabiston CM (2013) Effects of multiple concussions on retired national hockey league players. Journal of sport & exercise psychology 35: 168-179.
5. Kuhn AW, Solomon GS (2015) Concussion in the National Hockey League: a systematic review of the literature.
6. Benson BW, Meeuwisse WH, Rizos J, Kang J, Burke CJ (2011) A prospective study of concussions among National Hockey League players during regular season games: the NHL-NHLPA Concussion Program. Canadian Medical Association Journal 183: 905-911.
7. Jason I (2014) Concussions in the NHL: A narrative review of the literature. The Journal of the Canadian Chiropractic Association 58: 346.
8. Donaldson L, Asbridge M, Cusimano MD (2013) Bodychecking rules and concussion in elite hockey. PloS one 8: e69122.
9. Wennberg RA, Tator CH (2008) Concussion incidence and time lost from play in the NHL during the past ten years. The Canadian Journal of Neurological Sciences 35: 647-651.
10. Ruhe A, Gänsslen A, Klein W (2013) The incidence of concussion in professional and collegiate ice hockey: are we making progress? A systematic review of the literature. British journal of sports medicine 48: 102-106.
11. Sim FH, Simonet WT, Melton III LJ, Lehn TA (1987) Ice hockey injuries. The American journal of sports medicine 15: 30-40.
12. Goodman D, Gaetz M, Meichenbaum D (2001) Concussions in hockey: there is cause for concern. Medicine and science in sports and exercise 33: 2004-2009.
13. Biasca N, Simmen HP, Bartolozzi AR, Trentz O (1995) Review of typical ice hockey injuries. Survey of the North American NHL and Hockey Canada versus European leagues. Der Unfallchirurg 98: 283-288.
14. Pettersson M, and R Lorentzon (1993) Ice hockey injuries: a 4-year prospective study of a Swedish elite ice hockey team. British journal of sports medicine 27: 251-254.
15. Ruchinskas RA, Francis JP, Barth JT (1997) Mild head injury in sports. Applied neuropsychology 4: 43-49.
16. Hutchison MG, Comper P, Meeuwisse WH, Echemendia RJ. (2013) A systematic video analysis of National Hockey League (NHL) concussions, part I: who, when, where and what?. British journal of sports medicine 49: 552-555.

17. Meeuwisse WH, Burke CJ, Benson BW (2011) NHL Concussion Program: A 5-Year prosepective study. Clinical journal of sports medicine 13:380.

18. McCrory P, Meeuwisse WH, Aubry M, Cantu B, Dvorák J, et al. (2013) Consensus statement on concussion in sport: the 4th International Conference on Concussion in Sport held in Zurich, November 2012. British journal of sports medicine 47: 250-258.

19. Ljung C (1975) A model for brain deformation due to rotation of the skull. Journal of biomechanics 8: 263-274.

20. Gennarelli TA, Thibault LE, Adams JH, Graham DI, Thompson CJ, et al. (1982) Diffuse axonal injury and traumatic coma in the primate. Annals of neurology 12: 564-574.

21. Izraelski JS (2013) Concussion incidence and risk factors in the National Hockey League between the 2005-2006 and 2011-2012 seasons. Diss York University Toronto.