Mixed Methods Analysis of Injury in Youth Ice Hockey:

Putting Injury into Context

by

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Abstract

This thesis will discuss the results of a two-year 90 game study to consider the role violence and aggression plays in competitive minor hockey and its role as a mechanism for injury. The second objective of this thesis was to determine the contextual factors that lead to injury on the ice. Using a mixed methods approach, the study followed three minor hockey teams from the Ottawa-Gatineau region over two sporting seasons. The study found that players are not being injured due to aggressive or violent play but rather players are being hurt within the rules of the game. The contextual factors that were shown to lead to injury included: (1) body-checking, (2) time of the game, (3) player's body mass, (4) position played and (5) legal plays. Injuries were also broken down by anatomical site (head/neck, upper body and lower body); the upper body was affected by injury most.

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Part I: Research Context

Chapter One

Introduction

Hockey, Canada's national winter pastime, has received a great deal of press recently [1]concerning players' high risk of injury. Known as a particularly aggressive and violent sport, it is predominately played by those under the age of nineteen. In 2008 Hockey Canada reported over 550,000 participants (Emery, Hagel, Decloe, & Carly, 2010). Canadian data suggest that ice hockey injuries account for up to 10% of the injuries suffered by adolescents (Emery et al., 2010). Research has shown that reported injury rates in hockey have increased each year since the 1970s (Molsa, Kujala, Nasman, Lehtipuu, & Airakinen, 2000). Considering the plethora of injuries Canadian youth are experiencing it is imperative to gain an understanding of how and why injuries occur in order to work towards developing meaningful injury prevention strategies.

In this study, the focus was on three minor league hockey teams[i], two from Ontario and one from Quebec where body-checking was first introduced. In Ontario the players were 11 and 12 years old (Pee-wee division), whereas in Quebec players were 13 and 14 years of age (Bantam division). The difference in age is due to the fact that at the time, Ontario introduced body-checking at the competitive Pee-wee level, while Quebec did not allow body-checking until the Bantam level. The literature review that follows suggests that body-checking leads to a higher risk of injury than non-body-checking leagues. The objective of this thesis is to decipher what contextual game factors lead to youth injury from a mixed methods perspective. Knowing that body-checking causes injury is not enough to help prevent injuries; the contributing contextual game factors must also be understood. This thesis also looks at the supposed

[1] Ice hockey for the remainder of the document will be referred to as simply hockey

aggressive nature of hockey. Media sources have depicted professional hockey as a violent and aggressive sport that appears to be impacting minor hockey registration rates (CBC News, 2013). The results of this study run contrary to much of what has been recently reported in both popular and academic literature. Rather than hockey being a dangerous sport played by reckless youth intentionally inflicting harm on one another, over the course of the study relatively few injuries were observed and the players in general played well within the rules of the sport. In order to carry out the study a research team followed three teams and each researcher examined different phenomena that led to injury. The objective of the research was to move beyond basic injury reporting and to observe contextual factors that lead to injury.

In order to understand how and why injuries are occurring, it was necessary to observe how these injuries are occurring in situ. Here a host of factors were examined that contributed to youth hockey injury amongst two different age groups. The study focused on different contextual factors that led to injury occurrences. By observing and recording injuries and the contextual factors surrounding injury, I was able to analyze each specific injury and subject it to a content analysis. This involved: attending all league games and taking extensive field notes with the research team; compiling each set of field notes into a single database; fact checking each injurious play in the field notes with the corresponding video for that play; inputting this data into a Microsoft Excel spreadsheet (content analysis); and then conducting both an intra and inter-rater reliability test with my fellow researchers. In so doing I was able to isolate leading contextual factors that assist in understanding how and why players are getting hurt. The contextual factors included the act of body-checking, time of the game, player's body mass differentials as it relates to contact, playing position, and whether injuries occur on legal or illegal plays. The anatomical location (head/neck, upper body, and lower body) of injury was

also explored. Body-checking has been shown repeatedly by scholars to increase a player's risk of injury; however the specifics of why these players are getting injured through body-checking have not been fully explored. Injuries were positioned within the context of each period to determine whether certain periods lead to heightened risks. Body mass was used to determine if larger or smaller players are at greater risk for injury. Position as it relates to injury was evaluated by a breakdown of all three positions; goalie, defenseman and forward. Anatomical location of injury was broken into three distinct areas; head, upper body and lower body to determine if certain anatomical locations are more susceptible to injury. The final point of analysis focused on whether injuries occurred on legal or illegal plays determined by an official's call (penalty or no penalty) for each injury.

What was seen throughout the study was not an overly aggressive and violent sport. Media sources and scholars alike have found professional hockey to be aggressive and violent thus inferring that youth hockey also carries this mentality and inherent injury risk (Cusimano, Sharma, Lawrence, Ilie, Silverberg, & Jones, 2013; Nash & Lerner, 1981). Based on the data collected for this study it was evident that there were relatively few injuries over the course of the two seasons (90 games). . Injury frequency and severity was assessed and the data collected was indirectly compared against other sports of different ages and competitive levels to determine if hockey truly is a dangerous sport to participate in. This study evaluated each injurious situation to determine if the plays transpired within the rules of the game and whether they were aggressive in nature. This project intended to take a different approach to sport injury research in hope that its final conclusions can make important strides towards hockey injury prevention.

Chapter Two

Literature Review

An extensive amount of quantitative and qualitative research has been undertaken over the last few decades concerning injury in hockey. Many of these are large epidemiological studies have yielded staggering results about injury rates in youth and adult hockey populations (Daly, Sim, & Simonet, 1990). The fewer qualitative studies have focused less on injury and more on the culture surrounding sport and potential relationships to injury (Daly, Sim, & Simonet, 1990). Much is known about the voluntary rates of injuries, however, less is known about how and why players are getting injured. The study conducted here attempts to delve deeper into individual situations that arise during games to explore what factors are contributing to the staggering injury rates that larger epidemiological studies are repeatedly reporting (Emery, 2003; Emery, Hagel, Decloe, & Carly, 2010; Gerberich, Finke, Madden, Priest, Aamoth, & Murray, 1987). This study focuses on hockey players, ages 11-14 during their first year of body-checking in Ontario and Quebec.

Defining Injury

Although numerous scholars and scholarly domains have studied injury prevalence rates in hockey, a clear definition of injury has not been clearly established. In a quantitative study by Dick, Agel, and Marshall (2007), injury was defined as:

> 1) a result of participation in an organized intercollegiate practice or competition and (2) required medical attention by a team certified athletic trainer or physician and (3) resulted in restriction of student-athlete's participation or performance for 1 or more calendar days beyond the day of injury. (p.174)

The Handbook of Sports Medicine and Science, Sports Injury Prevention by Bahr and Engebretsen (2011) cites a consensus statement issued in 2006 by the sport of soccer where injury was defined in the broadest sense as any event occurring as a result of sport participation. Injuries were then classified into medical attention injuries; those that required assessment or treatment by a medical practitioner. Injuries were sub-divided based on time lost from sport participation (Bahr & Engebretsen, 2011). Both definitions are similar in that they both are extremely broad and do not account for personal differences within players, sport specific injuries and most importantly injuries that are not severe enough to miss time or require medical attention.

The difference in definitions impacts the rate of injury reported, but it also makes it difficult to compare injury studies. If an injury is only classified as an injury if it leads to time lost, it does not account for levels of physical trauma that lead to discomfort but do not prevent players from participating. This distinction is important when discussing a players experience and overall enjoyment of the game itself. Compounded on this is the manner in which injuries are actually recorded. Those studies that rely on voluntary reporting of injury either through medical reports, insurance claims or even team trainers do not account for players playing through pain, not disclosing an injury, or in some cases not aware an injury has occurred (especially as it pertains to concussions). These different approaches to documenting injury in youth sport create important discrepancies between studies and cast doubt on general conclusions made about injury frequency in youth sport (Fuller, Ekstrand, Junge, Anderson, Bahr, Dvorak, et al., 2006; Tegner & Lorentzon, 1991).

Agel, Dompier, Dick, and Marshall (2007) attempt to respond to this by taking an approach that deliberately strays from the voluntary retrospective, medical based reporting typically seen in large epidemiological studies. While still maintaining a quantitative approach, observational methods drive the research rather than relying on large (secondary) injury data banks from hospitals or insurance records. It is important to distinguish from voluntary reporting as some participants may decide to mask injuries in order to avoid time missed. It is important then to consider a definition outside of a purely medical model and consider injury more broadly to include physical trauma which involves levels of discomfort, whether severe or moderate. In this study I draw from Dumas and Laforest's (2009) work on skateboarding where they define injury as "any accident that stopped the skaters from practicing, whether requiring First Aid or not" (p.23). The definition requires an observational dimension; otherwise cessation of activity would not be recorded. The approach not only captures a broader range of injury, it also enables researchers to identify situational factors that lead to injuries or injurious situations. If steps are to be taken towards injury prevention, one needs to move beyond simply quantifying the amount of injuries that are occurring. Shifting how we think about injury and how injury can be recorded gives us direction in making these first steps.

Quantifying Injury in Hockey

Frequency of Injury.

Past medical reporting has been useful in documenting injury frequency and the types of injuries that are most prevalent. Yard and Comstack (2006) conducted a study using data between the years of 1990-2003 where they estimated that over 172, 128 injuries occurred over that span, 13, 250 injuries per year, had been reported in youth hockey in Canada. King and

Leblanc (2006) conducted a study in the 2002/2003 season in which they tracked emergency records in Ontario hospitals. King and Leblanc (2006) estimated that over 3000 children under 16 years of age suffered injuries worthy of immediate medical attention during the season of 2002/2003. Emery and Meeuwisse (2006) found through medical reports of children between the ages of 9-16 years of age that each season 30.02 injuries (hospital visits) occurred per 100 players.

Establishing a mechanism for injury that relates to the frequency of hockey injuries is important if comparisons across different sports are to be made. Hamel and Goulet (2006) studied those between the ages of 6 and 74 and found that hockey accounted for the second highest injury rates in Quebec. Emery, Meeuwisse, and McAllister (2006) found that within high-school sports, hockey ranked fourth in injury prevalence behind wrestling, gymnastics and football. Spinks and McClure (2007) concluded that when comparing injury of those participants under the age of 16 years old in soccer, hockey, baseball, football, rugby, basketball, volleyball, and karate, hockey had the most injuries per hour of play. Hockey and rugby had the highest rate of concussions of all contact sports (Koh, Cassidy & Watkinson, 2003), while Boden and Jarvis (2009) found that hockey, amongst all contact sports, had the highest rate of spinal injury.

Types of Injury.

Previous research has been useful in categorizing injuries in terms of their anatomical locations and frequency. Agel et al. (2007) studied collegiate hockey for 16 years and were able to classify injuries based on the area in which they occurred. The highest prevalence of injury occurred at the upper extremity (34.4%), lower extremity (34.3%), head/neck (15.4%), trunk/back (14.3%), and other (1.6%) were found from medical injury reports. Smith, Stuart,

Wiese-Bjornstal, and Gunnon (1997) while studying high school hockey were able to classify injuries further in terms of their musculoskeletal locations. Smith et al. (1997) found that the distribution was knee (14.8%); thigh/groin, shoulder, hip (11.1%); arm/elbow, head (11.1%); spine, chest/ribs (7.4%); chin and wrist (3.7%). The most frequent types of injury included: contusions (37%), ligament sprains (22.2%), muscle strains (14.8%), lacerations (11.1%), fractures (7.4%), dislocations (3.7%), and concussions (3.7%). Lorentzon, Wedren, and Pietila (1988) found similar results to complement these findings while looking at professional hockey in Sweden. It is clear from the above findings that contrary to recent media reports, concussions are not the only area of concern when discussing hockey injuries.

Mechanisms of Injury.

While understanding the frequency and type of injury is important, more qualitative information pertaining to how and why injuries occur is essential if steps are to be taken towards injury prevention. Agel, Dompier, et al. (2007) identified eight mechanisms of injury when dealing with collegiate hockey: contact with other player (47.7%), contact with boards or glass (21.6%), no apparent contact (9.3%), contact with puck (7.0%), contact with stick (6.4%), contact with ice surface (5.9%), contact with net (1.1%), and other (1.1%). This mechanistic approach to injury surveillance indicates that contact with another player accounts for the highest injury rate and that this mechanism deserves attention. These mechanistic data are valuable, but they still require further qualitative assessment to help understand what factors come into play when these incidents occur. For example contact with another player is an important starting point, but how is this contact occurring? There are many different types of collisions: hits from behind, legal hits, hits on a fore-check versus defensive oriented plays, players in vulnerable positions, two players competing for puck possession, etc. An important area for concern is that

studies performed on high school aged athletes found that those players receiving a body-check account for 53.1% of the injuries, while the checker is only 8.2-15.6% likely to experience an injury (Bernard, Trudel, Marcotte & Boileau, 1993; Smith et al., 1997). Numerous studies upon participants aged 11 to 14 years of age have demonstrated that player size plays a pivotal role in injury (Regnier, Boileau, Marcotte, Desharnais, Larouche, Bernard, et al., 1984; Stuart, Smith, Nieva, & Rock, 1995). What is clearly at the root of many injurious situations, however, is what Marchie and Cusimano (2003) noted: 83% of all youth hockey injuries are a direct result of body-checking.

As a result of these comparative studies between body-checking and non body-checking leagues several studies have shown a direct correlation between body-checking and injury in youth hockey (Emery, Kang, Shrier, Goulet, Hagel, Benson, et al., 2010; Macpherson, Rothman, & Howard, 2006; Regnier, et al., 1989). Other studies such as Macpherson et al. (2006) compared two teams in minor hockey. One team was in its first year of body-checking while another had two years of experience. Through observational methods it was found that greater hockey experience led to higher rates of injuries.

The use of qualitative data collection can enhance quantitative methods by providing more specific details about injury. A study by Covasin, Swanik, and Sachs (2003) found that 20% of all hockey players experience a concussion in their playing career. For the most part, these injuries go unreported (King & Leblanc, 2006). This phenomenon was explained by researchers: “it is likely that players under-report concussions as most concussions do not involve loss of consciousness, and players are concerned that they will be removed from practice or games” (Juhn, Brolinso, Duffey, Stockard, Vangelos, Emaus et al., 2002, p.47). As a result, more observational studies are required to understand the situational factors contributing to youth

hockey injuries. Little observational work has been conducted to-date. In those that have been conducted, they highlight a few areas of concern: fatigue, ice surface size, body-checking uses, size of players, and the culture that surrounds the game (Agel et al. 2007; Smith et al., 1997; Stevens, Lassonde, de Beaumont, & Keenan, 2008).

Qualitative Factors Contributing to Injury

Body-checking.

Hockey Canada proposes a 4 step progression when it comes to the act of checking. Step one is the act of positioning and angling, this is where an athlete can force an opponent in the direction they want without the use of physical contact (Hockey Canada, 2011, p.13). Step two is the second line of defense a player may utilize, where after a player is forced in a particular direction the stick may be used to free up the puck (Hockey Canada, 2011, p.18). The third step is the act of body contact. This is when the puck has been dislodged from the puck carrier due to steps one and two and now a player can use his/her body to get between the puck and the opponent. By definition body contact must only result from the active movement of the puck carrier (Hockey Canada, 2011, p. 25). Step four body-checking is the inverse of body contact. A body-check is body contact primarily caused by the movement of the opposing team's defensive checker. This movement is often directed in the opposite direction of the puck carrier in hopes of stopping their forward progress and ultimately separating the carrier from the puck (Hockey Canada, 2011, p. 31). For the purpose of this thesis and the articles within body contact and body-checking will both be referred to as body-checking as they both lead to physical contact and a heightened risk of injury.

The act of body-checking has been shown through numerous comparative studies between body-checking and non body-checking leagues to show a direct correlation to injury in

youth hockey (Emery, Kang, Shrier, Goulet, Hagel, Benson, et al., 2010; Macpherson, Rothman, & Howard, 2006; Regnier, et al., 1989). Agel et al. (2007) examined a host of factors that led to injury; however none were shown to be as detrimental as the act of body-checking. Bernard et al. (1993) took this a step further when they found that receiving a body-check was considerably more dangerous than delivering a body-check. When looking at the different collisions factors faced by players on the ice surface Gerberich et al. (1987) when looking at high school hockey players found that player collisions resulted in the greatest number of injuries (34.8%), boards (19.8%), and frame of the net (10.2%). Research in the area of body-checking needs to be refined to determine which events and contextual factors play a role that lead to injurious situations.

Position Played.

Several studies looking at minor hockey to professional hockey have attempted to conclusively determine which positions are most vulnerable to injury (Emery et al., 2011; Lorentzon et al., 1988; Molsa et al., 2000). If positions are separated into goalie, defence, and forward, some studies have shown that defensemen are at a higher risk (Emery et al., 2011; Lorentzon et al., 1988; Molsa et al., 2000). Another study performed in Denmark (ages 16-34) found that forwards and defence face similar injury risks while goalies have half the likelihood of getting injured (Jorgensen & Schmidt-Olsen, 1986). Other studies contradict Jorgensen and Schmidt-Olsen's (1986) findings by stating that goalies suffer the most minor injuries but few moderate or severe injuries because they do not participate in direct body contact. Goaltender injuries are from overuse, getting hit by pucks, or incidental contact (Emery et al., 2011; Lorentzon et, al., 1988; Molsa et al., 2000). Overuse injuries are classified as stress caused by exercise that the body is unable to endure that leads to anatomical injury (Schwellnus, Jordaan &

Noakes, 1990). Studies suggest that defensive players have the lowest number of minor injuries, but have considerably more moderate to severe injuries. Forwards fall between the two categories (Emery et al., 2011; Lorentzon et al., 1988; Molsa et al., 2000). It is important, however, to not only understand if certain positions are more prone to injury, but begin deciphering why certain positions might bring greater risk of injury. As such it is imperative to understand what types of injuries are seen at different positions, in terms of severity and time missed. Jorgensen and Schmidt-Olsen (1986) cite that goalies suffer mostly from knee injuries, while defensemen suffer mostly from head injuries, such as concussions. Forwards experience concussions but to a lesser degree and have the most knee injuries of all positions. With this in mind it is important to understand from a descriptive analysis what factors lead to such injuries.

Aggression and Violence in Hockey.

Kerr (1997) describes aggression as an unprovoked hostility or attack on another person which is not sanctioned within with the regular norms of society. The concept of violence is generally considered to be the most extreme form of aggression where physical force is used to hurt or injure another (Atyeo, 1979; Kerr, 2004). Therefore highly aggressive play can lead to an increase in body collisions, stick infractions and game-play outside of the prescribed rules. This type of behaviour is believed to coincide with an increase in the risk of injury. A study conducted by Emery and Meeuwisse (2006) on participants ranging in age (9-16 years old) concluded that 46.15 % of all game injuries occurred during the act of body-checking. Smith et al. (2007) were able to differentiate between two types of body-checking. The first was a player's intent to injure his opponent. The second was body-checking where the intent was to separate the opponent from the puck. A study conducted in 2005 on 12-14 year old hockey players noted body-checking was used in a violent way due to increased testosterone levels (Willer, Kroetsch,

Darling, Hutson, & Leddy, 2005). Studies such as these seem to suggest that aggressive body-checking leads to injury, while the second level of body-checking (according to Smith) is more benign. First, it is difficult to determine one's intent when delivering a body check, as Smith attempts, and second, if players are being injured on the second type of body-checking at a rate equal to or greater than the first type, does intent even matter? To assist in understanding how aggression contributes to injury it would be more productive to examine the rate of injury according to legal body checks versus checks that result in a penalty infraction. If players are executing plays within the rules of the game and are injuring players in the process, aggressive play may not be the problem, but rather enforcement and officiating of the rules themselves.

Player Body Mass Differentials.

Another area of concern with hockey injuries is the age and size of the athletes involved. Studies examining hockey throughout a lifespan have shown that with age and greater competition comes a higher risk of injury (Bernard et al., 1993; Bjorkenheim, Syvahuoko, & Rosenberg, 1993; Brust et al., 1992; Carter, Micheli, 2011; Emery, & Meeuwisse, 2006). These studies found that the highest risk of injury occurred in 15-17 year olds engaged in body-checking, which is notable for various reasons. First, adolescents in this category are at their peak growth velocity. Peak growth velocity refers to a time in an adolescent's life when anatomical growth exceeds structural reform, a time when there is

> a combination of muscle imbalances resulting from asymmetric growth, relatively tightened muscles as the soft tissues lag behind the osseous structures in longitudinal growth and decrements in proprioception and balance resulting from adjustment to rapid bony growth. (Carter & Micheli, 2011, p. 884).

A second reason why age is a catalyst for injury is the different height and weight of the participants. It has been found that when bodies become larger and collide, the risk of injury increases. A player struck by a larger opponent is more likely to be injured than by an opponent of similar or smaller size (Molsa et al., 2000). In fact it was found that when the largest player on one team collides with the smallest player on the opposing team there is a 357% difference in the force generated, which explains why the smaller player will be injured (Bernard et al., 1993). Therefore smaller players are at a greater risk of injury (Emery et al., 2010).

Time of the game.

Games of higher importance lead to higher risk-taking behaviour and therefore injury incidences are greater. Bernard et al. (1993) concluded that when losing by a large margin, players become more aggressive. Is this true for all players? In their study of NHL players they noted that when the game was within 10 minutes of its conclusion and a team was down by more than three goals more aggression was observed.

What is also pertinent in terms of game context is a player's perceived meaning of a game or the time of a game. If a game has more meaning for the players or as time runs out players could be willing to put themselves in a compromising position to help their chances at victory. This becomes more problematic as the game progresses due to the reality that players bodies wear down due to fatigue and are more susceptible to injury. While investigating elite high school athletes Smith et al. (1997) found that players who play 18-20 minutes of a 45 minute game are more susceptible to injury than players who play fewer minutes. Smith et al. (1997) also found that when participating in an elite level sport several times a week (four or more) injuries can occur due to fatigue and overuse. Fatigue throughout a game or season can lead to compromised structural integrity of anatomical structures (Carter & Micheli, 2011;

Emery et al., 2011; Gabbett & Domrow, 2007). Fatigue can also manifest itself in terms of an athlete's psychological well-being. A fatigued athlete is more likely to make mental lapses and put him or herself in harm's way (Komaroff, & Buchwald, 1991; Van der Linden, Frese, & Meijman, 2003). While this is difficult to monitor it is a factor that can lead to heightened injury risk. The idea of fatigue was not the main focus of the study but simply demonstrates that each individual athlete is subjected to different stressors while on the ice.

Legal Plays.

A factor that has not been thoroughly addressed by recent research is the role legal and illegal hockey plays impact injury occurrences. In one study by Gaumond, Trudel and Gilbert (2000) it was found that within "the bantam division, 84% of minor hockey injuries resulted from behaviors that are not penalized by the officials" (p.269). A legal play in hockey is one that fits within the rules prescribed in the rulebook. Players when beginning to play hockey learn these rules and also learn that there are punishments for playing outside these rules. These rules were developed to protect players from injurious situations and to allow for a free-flowing game without hooking, holding, etc. However it appears as though it is the league's enforcement of the rules that dictates what is called and what is not. If it appears that injuries are occurring on legal plays, perhaps new rules are not needed but rather stricter enforcement..

Summary

This thesis has two primary goals. The first was to document injury in different leagues and ages to determine frequency and causation. What was found during this mixed methods approach was a game that was not inherently aggressive or violent game, a notion that is contrary to many media sources and scholarly articles written about professional and youth hockey. The second aim is to present contextual factors that were seen to contribute to injury frequency and

severity that either confirm previous research or add to the literature. The contextual factors uncovered through this study were: body contact, position played, player body mass differentials, time of the game, and the notion of legal plays

Chapter Three

Methods

The previous chapter demonstrates how past studies have identified and quantified injuries in youth hockey. Past research into this phenomenon has neglected crucial contextual factors that lead to injuries. Hence for this project it was deemed necessary to include a qualitative component to understand injury frequency, the contextual factors surrounding injury and the anatomical sites afflicted by injury.

This study is part of a larger 3 year project observing injury in both male and female competitive hockey within the Ottawa-Gatineau region. The project used a mixed methods approach in order to combine the strengths from both qualitative and quantitative research designs. The portion of this study that differs from other studies in this field is the qualitative observation that occurred at each game. Such a method requires a vast amount of resources and time allocation. A research team of graduate students and undergraduate volunteers was assembled from the University of Ottawa. Being able to observe every game of 3 different teams allows for a comparative component between teams. This approach to data collection has been used successfully in the past to gain greater insight when observational methods were implemented (Dumas & Laforest, 2009; Laforest & Dumas, 2003).

The first year of the project involved the comparison of two boys and one girl's minor hockey teams (ages 11-12) from the Ottawa-Gatineau region. The focus was to compare and examine the injury differences between body-checking (Ontario boys) with the two non body-checking (Quebec boys and Ontario girls) teams. The second year consisted of observing and assessing injury and the culture/environment of competitive girls' hockey in Ontario. The final year investigated the situational factors and contextual details in the introductory year of body-

checking in Ontario and Quebec. The research presented in this thesis is from years 1 and 3 consisting of three minor hockey teams.

Sample Group

In order to meet the requirements of the current study, two sample teams were chosen from Ontario and Quebec during their introductory year of body-checking. At the time body-checking was introduced in Ontario at the Pee-wee (ages 11-12) competitive level, whereas in Quebec, body-checking was introduced at the Bantam (ages 13-14) competitive level. Quebec introduced body-checking at a later age as they felt it led to less injuries over a player's career. This has now been confirmed and Hockey Canada has made this a national ruling (Hockey Canada, 2013). Two teams were recruited for the study, one Pee-wee age minor hockey team in Ontario and one Bantam minor hockey team from Quebec. Due to geographical conveniences, the teams from Ontario were chosen from the Ottawa District Minor Hockey Association (ODMHA) and the Association de Hockey Mineur de Hull (AHMH) in Quebec. For the Ottawa team the Gloucester Rangers Minor Pee-wee AA team was asked to participate as well as the Hull Olympiques Bantam BB. These associations were chosen because they took part in previous years of the study and a positive rapport had been established. The Hull Olympiques Bantam BB team was chosen because their games are played in the Outaouais region compared to the AA teams that travel throughout southern Quebec. Aside from the important comparative dimension both teams can provide, there were important questions at the time of selection being discussed within the hockey communities concerning when body-checking should be introduced in minor hockey. Using two different teams of two different ages from two different leagues can elicit better results when looking at the nature of aggression and violence. In order to collect the data needed for the study the research team used a two-dimensional research approach: (1)

observational approach, using video recordings and field notes of each competition; (2) post-game injury reporting.

Documenting Injury

Dimension I: Observations, observation grids, and video.

Observations: As previously stated, most hockey injury studies, like other youth sport injury studies, are focused primarily on secondary data reporting. The apparent problem with this type of research design is that less apparent injuries such as "bruises, scratches, cuts" remain overlooked and undocumented (Dumas & Laforest, 2009, p. 24). Thomas (2011) states that past sport studies have used mainly medical reporting, or retrospective processes to classify and develop injury rates, while the context of the injury itself is lost. Observations of the phenomenon in its natural setting can be useful to analyze the specific injuries that are seen and when combined with the quantitative enumeration of injury a greater understanding can be gained. Dumas and Laforest (2009) conducted a research study whereby they observed injuries in a skateboard park. The two researchers observed that only one percent of the injuries received medical attention. Researchers have found that direct observations are important to document injuries that would not have been recorded using traditional injury enumerating channels (Dumas & Laforest, 2009). Williamson and Goodman (2006) conducted a study directly related to hockey. The two researchers found success by combining official injury reporting sheets with retrospective player surveys and direct observation of what transpires on the ice during competition. The authors regarded the observational component to be paramount in categorizing injury extents, especially the category of concussion. The researchers were able to observe the rapid acceleration and deceleration of the head during a collision which led to trauma and injury.

Due to their observational research design the authors were able to develop their own injury definition based on observed signs and symptoms (Williamson & Goodman, 2006, p. 129). Without this observational component to complement the medical assessment of the concussion, it would have been difficult to categorize the specifics of a collision resulting in this type of trauma.

While carrying out an observational study it is clear that a team of researchers is required, as one set of eyes is incapable of collecting all the data during a given experience (Laforest & Dumas, 2003). The research team was comprised of one doctoral student, two Master's students, and a team of undergraduate students who were assembled and trained on how to use the observation grids and what observational evidence was important. Each team member was affiliated with the University of Ottawa and attended each and every regular season and playoff game. Practices and tournaments were not included in the study. Team leaders were assigned to each team along with a supporting cast. The team leaders were all post-graduate students and guided undergraduates at the games. All post-graduates had experience playing hockey either at the competitive levels or in some capacity. Dewalt and Dewalt (2002) state that observational research is strengthened when the researchers have expertise in the field, therefore all undergraduate students chosen to assist had to have prior knowledge of hockey.

Every researcher at each game was given a note pad, a pen, a glossary of terms and their definitions as well as an observation grid devised by the research team to aid in injury categorization (See Appendix B). Each researcher was trained on how to use the observation grids and what to look for throughout a game. When an injurious situation was seen a researcher was required to record the time of the game so it could be reviewed later on video, the score of the game, the player or players numbers involved, a quick description of what transpired as well

as anything that seemed interesting to the researcher. Researchers were spread out in the arena to gain different vantage points of every play and injury. These field notes and observation grids would be collected at the end of each game and transcribed into one cohesive document to then be compared against the video of the game. Researchers also had access to the participating team's dressing room and coaching staff which according to Bernard et al., (1993) allows for greater insight into injury occurrences. In the coming days, a minimum of two researchers would re-watch each play to ensure that the transcribed field notes and observation grids matched the play in question.

Observation grids: In order to systematically observe and evaluate the multifaceted events that transpire at an hockey game, the study implemented an observation grid (See Appendix B) to document all injuries. The observation grid has been adapted from previous observational injury studies, most notably the injury severity grid which Laforest and Dumas (2003) designed for their own study on skateboarding injuries that was previously mentioned. With the use of the injury grid our research team was able to assure the reliability and validity of the results to a greater extent when combined with post-game analysis of the video. It also allowed the research team to determine the severity of the injuries: (1) slight (needs comforting from team trainer); (2) medium (First Aid or minor injury); (3) severe (First Aid or major injury); (4) very severe (medical attention is needed). Young (2004) noted that injury and the personal emotional ramifications of injury in youth sport have been, and still are, almost entirely ignored. This is something that can be addressed through our new injury definition that includes an area for discomfort. Smaller injuries or being hurt can affect one's enjoyment and overall experience which can then affect the rates of enrollment within a given sport. Using the study's new injury classification and research design, injuries can now be documented without requiring a player to

report it. As such, regardless of a player's decision to play through the pain, the initial reaction to an injury was observed and documented. This could be something as simple as shaking a hand vigorously after receiving a slash with a stick to something more noticeable such as a player crying out in pain and withering on the ground after fracturing a bone. Along with the first aid severity scale used by Laforest and Dumas (2003), a time lost component was used in terms of the observation grids as well. This sort of documentation was used by the Canadian Intercollegiate Sports Injury Registry (CISIR). According to the CISIR an injury is "any injury resulting in one or more complete or partial sessions of time loss" (Meeuwisse, Sellmer, & Hagel, 2003, p. 380). In hockey, a player's time lost would be noted if they missed a shift, a period, the remainder of a game or sequential games due to an injury. The time loss categorization is consistently used in sport injury research (Messina, Farney, & DeLee, 1999; Schick & Meeuwisse, 2003).

It is certain from the literature that one cannot entirely rely on penalties as a measure of aggressive play (Kelly & McCarthy, 1979; Russell & Russell, 1984; Vokey & Russell, 1992). In this study penalized versus non-penalized plays was one means of recording the role aggressive or illegal play has on injuries. To assist in determining if aggression or violent plays led to an injury the research team employed an adapted observation grid stemming from the works of Brunelle, Goulet, and Arguin (2005). This system was developed to document Adversary Interactions and Nonconformity with the Rules (AINR). Brunelle et al. (2005) described the system of AINR as "instrumental transgressions tied to game play, and non-instrumental transgressions tied to players' emotional reactions" (p. 296). The modified version (See Appendix B) used in this study helped to determine if injuries occurred from incidents that are part of the game (instrumental transgressions) or not part of the game (non-instrumental

transgressions). An example of an instrumental transgression is a hook to prevent a break-away, while a non-instrumental transgression would be a retaliatory slash after receiving a body-check. These plays were documented when an injury occurred.

Besides determining if aggression played a role in injury, injury was to be examined through the contextual factors within a game. This is a very important aspect to the study because it is the information that can be achieved through in-person observations made over the course of the season. By drawing from previous injury studies the following mechanisms of injury were used: contact with another player (Agel et al., 2007; Marchie & Cusimano, 2003); contact with stick or puck (Agel et al., 2007; Stuart et al., 2005); contact with ice (Smith et al., 1997); and contact with boards (Boden & Jarvis, 2009; Juhn et al., 2002). A player can go into the boards on his own accord and be injured or can be hit by a player into the boards and suffer an injury. This is an important distinction which has not been previously reported in any hockey injury study. The recognition of a new contextual factor and how prevalent it is in the categorization process proves how first-hand observations are valuable. Categorizing injury in terms of their contextual factors is crucial for determining the primary causes of injury and any trends displayed on the ice surface.

The contextual factors formulated in the study were based on the research teams prior knowledge of the game. Injury mechanisms such as body-checking, pucks, sticks, etc were easy categories to formulate. However additional categories as seen in (Table 2) were seen within games and were added as the season went along such as initial body contact and attentional focus of the player who was injured. In these situations the research team had to re-watch previous videos of injuries to include these factors. At the end of the season each injury was reviewed along with its corresponding field notes, observation grid, and post game injury assessment.

This data was then transferred into a Microsoft Excel spreadsheet to create a content analysis that could then be used to decipher which contextual factors were seen in various injurious situations.

Video: The research team videotaped each game from a single wide angle perspective to assist in post-game analysis. This helped when reviewing the games, confirming findings and observing what may have been missed in real-time. Giorgi and Giorgi (2003) explain that "it is even possible to videotape the behaviour of others and then replay it and establish behavioural meaning units rather than verbal ones" (p. 31). With the use of video, the research team was able to document a frame-by-frame analysis of all play that occurred around a given injury. With this information it is possible to understand more clearly how and why injuries are occurring and even show trends and patterns of injuries. Most importantly, video analysis helped the research team understand what scenario led to an injury. Parkkari, Kujala, and Kannus (2001) argue that "careful video analysis of the mechanisms of sports injuries would likely reveal new ways to decrease the number of injuries" (p. 993). In addition to video evidence and direct observations of the events at each competition, extensive field notes, and observation grids aided in describing and analysing the surrounding influences and atmosphere that contributed to youth hockey injuries.

Dimension II: Post-game injury assessment (PGIA).

In order to obtain a clear documentation of the injuries incurred during the season, team physical trainers were allotted PGIA's (See Appendix C). Team trainers were instructed on how to fill out the PGIA's prior to the season and were reviewed with the trainers if problems arose. PGIA's were conducted by the trainer with the player in question. The player had to miss regular playing time in order for it to be considered an injury according to the previously stated

definition. It requires little effort and time from the trainer, while providing important details about the type of injury incurred, its anatomical location, and its severity. The intention of the PGIA was not to gain a medical in-depth analysis but rather to get a quick assessment of the injury, which included anatomical site of the injury, type of injury, etc. In other words, it was information which was not possible to ascertain through observations from the stands.

The PGIA guide that was used is an adapted version of the Injury Surveillance Sheet (ISS) developed by Dick et al. (2007). Our research team employed other hockey specific injury studies to make the following modifications to the ISS: categories for anatomical sites or injury and physiological trauma (Smith et al., 1997), and a breakdown of areas on the ice surface (Gilbert & Trudel, 2000). Anatomical sites were used in order to classify injury, as developed by Smith et al. (1997). The specific anatomical sites include: knee, thigh/groin, shoulder, hip, arm/elbow, head, spine, chest/ribs, fingers, and wrist. These more specific anatomical sites were adapted as the study progressed to 3 larger categories (head/neck, upper body and lower body) to aid in analysis. The physiological trauma categories include: contusion (bruise), sprain, strain, laceration, fracture, dislocation, and concussion. By providing a spatial map of injuries one can determine where youth are most frequently being injured and what parts of the ice are proving to be most dangerous.

These PGIA's gave the research team a snapshot of each injury, which could be compared with video and other collected data to further strengthen the correlation between certain contextual factors and injury. Some factors include data such as height, weight, position and penalties called or not called during the game. PGIA's were also compared against time sheets and league reports.

Beyond injury severity this study was concerned with the contextual factors leading to injury. Using field notes and game sheets provided by the leagues (ODMHA/AHMH), penalized versus non-penalized plays were documented as they pertain to injury. In doing so, it was possible to determine if players were being injured or potentially injured on plays deemed legal or illegal (penalty called) by officials. While it is known that there is a level of subjectivity in officiating and incorrect calls are made over the course of a season, adding another level of subjectivity by assessing official calls would be equally problematic.

Qualitative Content Analysis.

Content analysis has traditionally been utilized in communications research where a communicative text (oral or written) undergoes a systematic analysis where specific elements are broken down and enumerated to determine repeatable patterns that can be compared against other communicative texts. The term text, however, should not be limited to formal communication and instead can be applied to any form of human expression. For example, in Clifford Geertz's (1973) now classic work "Deep Play: Notes on the Balinese Cockfight", he approached the sport as a ritualized text that required deciphering and interpretive analysis. In this way any behavior can be understood as a 'text', not so much because of what the behavior consists of, but rather how it is approached. In this way one can examine plays within a hockey game as texts by breaking down the activities into definitive descriptive scenes. It is in this manner that injuries in minor hockey were documented, whereby each injury situation was broken down into an isolated event with discernible parts that were qualitatively described and enumerated. Working from what Krippendorff (1980) describes as content analysis the study utilized "a research technique for making replicable and valid inferences from data to their context" (p.21). In this study over 90 games, over 2500 athletic exposures and over 63

contextual factors were examined to identify repeatable patterns to determine potential overlap across texts and eventual inferences about leading contributing factors to injury (See Appendix F).

A mixed methods approach was used so that the strength of qualitative observation could yield new results not previously found with purely quantitative epidemiological hockey research. The research team concluded that through direct participant observation the study was able to include: higher quality data, a higher quality of interpretation, and the ability to formulate new research questions, and recognize rare occurrences (Dewalt & Dewalt, 2002). Higher quality data is available due to a truer understanding of the context and less reliance on prior conceptualizations (Patton, 1990). By triangulating field notes, observation grids, post game injury assessments and the game-play video it was possible to gain insight into individual injuries that large retrospective studies have not been able to show. Furthermore by adding the aspect of a content analysis to the research design, each injurious play could be compared to one another to determine repeatable patterns that contribute to injury.

Part II: Articles

Article One

Observational Analysis of the Not-So Violent Sport of Youth Ice Hockey: Is it the Injurious Pastime it is proposed to be?

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Abstract

This article will discuss the results of a two year 90 game study, to consider the role violence and aggression plays in competitive minor hockey and its potential role as a mechanism for injury. Using a mixed-methods approach, the study followed three minor hockey teams in the Ottawa-Gatineau region over two sporting seasons to gain both a mixed methods assessment of injury. In contrast to many leading reports about the role violence plays in hockey injury, the results from this research indicate that participants are not being injured due to aggressive or violent plays. Rather the majority of injuries are occurring on "hockey plays" performed within the rules of the sport. While these results do not intend to entirely refute the vast literature identifying the role aggression and violence plays in injury causation, it does, however, question its universality when discussing hockey and the tacit acceptance that hockey is a violent and dangerous sport.

Introduction

The sport of ice hockey has been under constant scrutiny recently because of the [2]increased documentation of injury at both the professional/elite and amateur level. In response scientific and popular media reports tend to frame hockey as an overly aggressive sport that is putting participants at serious risk of injury. These popular perceptions are at odds with what Hockey Canada promotes as their mandate, which is to "Lead, Develop, and Promote Positive Hockey Experiences" (Hockey Canada, 2013). As a result Hockey Canada must contend with these media reports and scientific findings on aggression and violence in hockey as it impacts their organization and may become a deterrent for parents to register their children in the sport. In 2008, Hockey Canada released a study that reported over 550,000 Canadians participate in hockey (Emery, Hagel, Decloe, & Carly, 2010), most of whom are children. However within the past year Hockey Canada commissioned the hockey gear company Bauer to conduct a study to determine why enrollment rates in hockey are currently stagnant. The study came up with three main conclusions: hockey was too expensive; consumed too much time; and that there were health and safety concerns which were proving to be a deterrent for parents registering their children in the sport. Interestingly, enrolment rates are on the rise for children under the age of 13, yet there is a stark decline by the time children becomes teenagers. Cost and commitments to other activities are certainly factors but these dropout rates coincide with the introduction of body-checking which may be influencing decisions to withdraw from the sport (CBC News, 2013). It is also important to note that Hockey Canada has now gone towards a development program based on a pyramid of excellence. This means streaming high level talent towards elite status to one day represent Canada on a national stage. By doing so, it suggests performance is a

[2] For the remainder of the article ice hockey will simply be referred to as hockey

priority and they will need reconcile this with their overall mandate of ensuring children of all ages have a fun, safe enjoyable environment to experience the sport..

Over the past 25 years there has been extensive print media detailing the aggressive and harmful nature of hockey. To understand trends in media coverage of hockey injury in North America, Cusimano et al. (2013) performed thematic and content analysis for the past twenty five years of four of the largest newspapers in the United States and Canada (*The Chicago Tribune, New York Times, Toronto Star and Vancouver Sun*). Their study highlighted the increased attention the media was paying towards aggressive and violent on ice behaviour leading to traumatic brain injury (TBI) in professional hockey leagues. In the article they state that "American and Canadian media showed similar recent trends to increasingly report on the need for rule changes and the need to protect youth hockey players from TBI" (Cusimano et al., 2013). The study also disturbingly reported that aggressive acts on the ice were used as a tactic by coaches and are fully endorsed to gain a competitive advantage. The sport was described as violent and the equipment that was once designed to protect players was now a proponent of injury itself. The study also points to the increased public attention about head injury in contact sports, but does little to critique the media maelstrom that both celebrates/profits from on-ice violence/injury yet condemns it when it occurs. Perhaps what warrants closer examination, however, is the uncritical treatment of violence in hockey, which is tacitly accepted to be a primary cause for the apparent increase in injury.

However before moving forward it is important to understand what is meant by sport aggression and violence. Kerr (1997) describes aggression as unprovoked hostility or attack on another person which are not sanctioned within regular societal norms. However, within a sporting context two opposing teams have willingly agreed to submit to aggressive acts in the

pursuit of victory. Kerr (1997) continues to state that aggression in team contact sports is intrinsic and sanctioned provided the plays remain within the boundaries of certain sporting rules. The term "violence" is considered to be the most extreme form of aggression, and can be used in two ways: (1) a violent act such as a violent collision or tackle or (2) a physical force aimed at hurting or injuring an opponent (Atyeo, 1979; Kerr, 2004). This article will speak to the results of a two year 90 game study, to consider the role violence and aggression plays in competitive minor hockey and its potential role as a mechanism for injury. In order to gain both a qualitative and quantitative perspective on hockey injury a mixed-methods approach was implemented.

Methods

The Larger Research Initiative.

This study is part of a larger 3 year initiative involving both male and female hockey teams in Ontario and Quebec. Within this larger scope of practice the objective for this specific study was to quantify injury and observe whether hockey truly does involve aggressive and violent acts. A mixed method approach with an observational component was used to gain a deeper understanding of the context of hockey injury. The first phase (year one) of the project involved examining the difference in injury occurrences between Pee-wee (11-12 year olds) contact and non-contact leagues. To do so one competitive body checking Ontario boy's hockey team was chosen along with a competitive non-body checking Ontario girl's team and a Quebec boy's non-body checking team. Phase two (year two) consisted of the culture and environment surrounding injury in girl's hockey. In phase three (year three) a comparative study was conducted between the different years of body contact initiation amongst Ontario (Pee-wee, 11-12 years old) and Quebec (Bantam, 13-14 years old). In this article only the data collected from

phases one and three are presented for the simple reason that year two focused exclusively on girls hockey.

Participants.

At the time of this study Ontario and Quebec introduced body-checking at different ages with children in Ontario body-checking at 11-12 years old (Pee-wee) and children in Quebec body-checking at 13-14 years of age (Bantam).[3] The study was performed over two seasons from 2009 to 2012. In the 2009-10 season a team from the Ottawa (Ontario) District Minor Hockey Association (ODMHA) was chosen at the competitive AA Pee-wee level. During the 2011-12 season another team from the (ODMHA) and the Association de Hockey Mineur de Hull (Quebec) (AHMH) were selected. Our participants were compromised of a competitive AA Pee-wee team from Ottawa (11-12 years old) and a competitive Bantam BB team from Hull (13-14 years old). Minor hockey in both provinces is open to male and female participants, but the three teams were made up of exclusively male players. The league coordinators, coaches, trainers, parents and players consented to participate in the research study. Individual player information was obtained prior to the beginning of the hockey season. This information included: name; date of birth; position played; height and weight.

Games Studied.

The research team followed each of the three teams from the beginning of the regular season through playoffs. A total of 90 (66 regular season and 24 playoff) hockey games were documented between December 2010 and March 2012. It is important to note that the data for the 2009-10 season is missing some games as the study did not begin until mid-season due to a

[3] A modification to playing rule 6.2b was approved to remove body-checking from Peewee levels and below in those leagues affiliated with Hockey Canada, starting in 2013-2014 (Hockey Canada, 2013)

delay in receiving research ethics approval. Each team did participate in pre-season games, practices and tournaments however these events were considered to be outside the scope of the study and were not observed. Injuries during tournaments, however, were tracked by team trainers and noted by the research team but not used in the final results. Games were a total of two 15 minute stop time periods and a third 18 minute stop time period with a small pause between each period of play. Note that a total of five games were lost due to technical errors with the video but field notes, observation grids and post game injury assessments were available. The research team was comprised of graduate and undergraduate students from the University of Ottawa and were all trained on data collection techniques.

First Dimension: Observations, observation grids, and video.

What differentiates this study from other epidemiological research is its injury definition and direct observational approach. Each game was attended by a team of researchers that observed the game from different vantage points. This ensured that no single play was missed and no contextual detail was lost. Each researcher was to take field notes on any play that was to be considered dangerous or injurious based our study's injury definition. Researchers were also given observation grids (See Appendix B) to help categorize these plays quickly and efficiently. The observation grids were adapted from the works of Dumas and Laforest (2003) from their study on skateboarding injuries. The tool allowed the research team to determine the severity of the injuries: (1) slight (needs comforting from team trainer); (2) medium (First Aid or minor injury); (3) severe (First Aid or major injury); (4) very severe (medical attention is needed). The observation grids also helped categorize a player's time lost due to injury. The time lost categorization is consistently used in sport injury research to define severity (Messina, Farney, & DeLee, 1999; Noyes, Lindenfeld, & Marshall, 1988; Schick & Meeuwisse, 2003). These

observation grids also allotted a section for any type of aggressive or violent behaviour that was observed so it could be reviewed on video at a later date.

Each game was videotaped from a single wide angle perspective, accounting for blind spots, to allow the research team to review any portion of the game, specifically injurious ones, using computer software (*Final Cut Pro* ©). Parkkari, Kujala, and Kannus (2001) argue that "careful video analysis of the mechanisms of sports injuries would likely reveal new ways to decrease the number of injuries" (p. 993). When an injury was found, the video was broken down frame by frame to better understand the situation and factors that led to injury.

Second dimension: Post-game injury assessment (PGIA).

A post game injury assessment (PGIA) was used within the study, which provided a quick assessment of injury by the team trainer if a player missed regular playing time. It is important to note that trainers were instructed on what constituted and injury and how to record an injury. There was also never an instance where a trainer recorded an injury that was not seen by the research team through observational means. Adapted from the Injury Surveillance Sheet (ISS) developed by Dick et al. (2007), it is not intended to gain an in-depth medical analysis of an injury but rather a snapshot. Modifications were made to the ISS based on other hockey injury studies such as categories for anatomical sites or injury and physiological trauma (Smith, Stuart, Wiese-Bjornstal & Gunnon, 1997), and a breakdown of areas on the ice surface (Gilbert & Trudel, 2000). Anatomical sites were used in order to classify injury as developed by Smith et al. (1997), which were narrowed down to head/neck, upper body and lower body. The physiological trauma categories include: contusion (bruise), sprain, strain, laceration, fracture, dislocation, and

concussion. PGIA's gave the research team a snapshot of each injury, which was then compared with field notes, observation grids, and video to strengthen validity.

Qualitative Assessment of Aggression and Violence.

In order to determine what impact aggression and violence played in youth hockey, the study introduced another level of injury assessment that determined if the injury was the result of an act of aggression or violence. To reiterate, aggression is defined as an unprovoked hostility or attack upon another that is not sanctioned with the rules of a game or societal norms (Kerr, 1997). Whereas violence, is considered to be the extreme form of aggression where physical force is aimed towards hurting or injuring an opponent (Atyeo, 1979; Kerr, 2004). The point here is not to make distinctions between aggression and violence but rather to identify behaviour that; (1) falls outside the rules of the sport and puts players at risk for injury; (2) showed excessive physical force (body-check) that went beyond literal game tactics of separating a player from the puck; and/or (3) demonstrated acts of verbal or physical intimidation during or after game-play. This checklist was developed among the researchers to capture if a play met the criteria for aggression and violence, and if so, the incident was flagged, thoroughly described through field notes and then video game footage was reviewed frame by frame to get a more detailed reading of the act and any potential actions leading up to or following the act itself.

Data Analysis.

Once all the data was collected in the form of field notes, observation grids, PGIA's and video, information was transferred to a Microsoft Excel spreadsheet that included 63 tabs broken down into12 categories. The categories are as follows: game specifics, player position, injury severity, body location of injury, injury mechanisms, penalties, periods, ice location, body mass,

game-play and descriptive observations. In this article 2 of the 12 categories will be used to describe what was seen on the ice and ultimately determine what actions on the ice were aggressive or violent. The two categories used are penalties and descriptive observations. Penalties from the games were noted by use of the league game sheets. If an injury occurred and a penalty was called this was noted. Descriptive observations such as time or score of the game, location on the ice and the classification of penalty were also recorded. An example of a penalty classification would be a roughing or elbowing call.

The content analysis was compiled by two members of the research team. Each injurious incident was reviewed using field notes, observation grids, PGIA's and the video evidence. Each contextual factor (63 in total) was thoroughly examined and placed within the content analysis. However for the use in this article only the categories dealing with injury frequency and severity as well as aggressive and violent behaviour, which are referred to as 'transgressive behaviour', are presented. The content analysis involved providing a narrative summary/description of each injury situation, which included a point by point breakdown into identifiable elements that were eventually enumerated and coded. Each injury incident also underwent inter-rater and intra-rater reliability tests. These tests are to ensure reliability and validity of the collected data between coders and within a single coder. Three of the five research team members volunteered to perform this task. A total of eight games per team were chosen by a random number simulator. This accounts for 24 of the 90 games collected. Within each game that was selected by the simulator, each injurious situation was re-evaluated. Each member came in and re-watched the clips for each injury and filled out all 63 tabs on the Excel spreadsheet again. Two weeks later, the same tasks were performed but the injuries were randomized in a different order to discourage prior memory bias. Each of the three coders had by this time

completed the test twice. These two sheets were compared against one another to determine intra-rater reliability as well as against the group to determine inter-rater reliability. In general there was excellent inter rater reliability with all three raters agreeing on the presence of 93.3% of contextual factors and other descriptors of plays.

Results

A total of 2681 athletic exposures were observed and recorded over the span of 90 hockey games involving three consenting teams and their opponents. An athletic exposure was defined as anytime a player participated in a game or warm-up. For instance if both teams dressed 18 players for a game it would be classified as 36 athletic exposures for that game. Of these 2681 athletic exposures there were 181 observed injuries which included the following injury categories: discomfort; missed shift; and left game did not return. These injuries can be broken down as: 93 (51%) incidences of discomfort (left ice did not miss a shift); 67 (37%) incidences of shifts missed due to injury; and 22 (12%) incidences where a player left the game and did not return. Of the 181 injuries only 22 would be classified as an injury by traditional definitions of injury, left game and did not return. Of the 22 incidences only 7 resulted in a player missing more than the game in question. These 7 incidences accounted for a total of 27 player games lost. One player missed one game, five players missed two games and one player missed a total of 16 games after his injury. The 7 major injuries included: one fractured clavicle; one fractured wrist; one fractured ankle; two sprained wrists; one shoulder contusion; and one player with reported whiplash symptoms.

It is important to note that going forward only the category of left game and did not return will be used. This shrinks our injury totals from 181 to 22 injuries so that our study can be

generally compared to other studies utilizing the same injury definition. However it is important to note that utilizing a definition that encompasses discomfort does other insight, less about injury severity, but more about how these minor injuries might impact players players' experience in the sport, which is a pressing concern for sport organizations and a general public calling for increased physical activity levels for youth..

Table 1

Total Number of Injuries and their Classification through 90 Games

Number of Injuries		Injury Categories			
Total		Discomfort	Missed shift	Left game/Did not return	Total games missed due to injury
181		93	67	22	27

Note: The table shows the studies total number of injuries broken down into time lost as well as the number of games lost to injury.

When examining if aggression and violence impacts injury rates, it was determined that there were 21 instances of aggressive or violent play. Of the 181 injuries 21 (12%) occurred on identified aggressive or violent acts, 11 of which involved players delivering hits from behind. The other 10 acts included spearing (using your stick as a joust), slashing, elbowing, charging, punching, and slew footing (kicking out an opponent's feet). Of the 21 instances, 14 were awarded a minor penalty call. The study saw 22 cases of injury by the classic definition and only 1 instance occurred on an act deemed aggressive or violent. There were 4 classified incidences of aggression that resulted in discomfort. Each instance involved the hockey stick itself as a tool. 3 of the 4 instances involved either an aggressive slash to take down a player or a retaliatory slash

with the intent to harm (violence). The fourth instance involved a player using the butt-end of this stick to inflict pain to an opponent's ribs in order to gain position in front of the net.

Of the 22 incidences of injury only 5 (23%) resulted in a penalty called. The penalties that were called were: a 2 minute minor for boarding; a 2 minute minor for a hit to the head; a 2 minute minor for a hit from behind; a 2 minute minor for roughing; and one 5 minute major penalty for hitting from behind. These plays did not fall under the category of transgressive behaviour because they were classified as either accidental or not intended to cause bodily harm. A hit from behind some would argue is a vicious or violent act but in this instance it was a player attempting to make a hockey play, separate the player from the puck, and the opponent turned his back at the last second.

Discussion

In carrying out this research which was to document injury in youth hockey, important results arose that challenge general notions on aggression and violence in hockey. Over the course of this study, game-play was not observed as being overly dangerous or aggressive. After attending 90 hockey games and reviewing hundreds of hours of video it was determined that the vast majority of injuries were predominantly on legal, non-violent or non-aggressive plays. The results obtained over two playing seasons suggest that hockey may be a less aggressive and violent sport than scientific and popular literature depicts. Of the 90 games that were observed and the 2687 athletic exposures over that time, only 22 incidences were seen that would constitute an injury by traditional definitions of injury—participant time missed or required medical attention. Of the 22 incidences only 7 required the participant to miss subsequent games. This leads to only 8.19 injuries per 1000 athletic exposures (22/2687) which when

indirectly compared to other sports is a low epidemiological statistic. As stated earlier injuries included fractured bones, sprains/strains, contusions and whiplash symptoms. The only instance where a player required a visit to the hospital and missed significant time (16 games) occurred on a play where the player attempted to deliver a hip check and accidently got his foot caught between the opponent's leg and the boards and fractured his fibula. Three injuries occurred when players attempted to check an opponent and jammed their wrists; one resulted in a hairline fracture and the other in a sprain/strain. The other wrist sprain occurred while a player was on a partial breakaway and the defender dove for the puck and took out his legs. The player slid hard into the boards and braced himself with his wrist. The shoulder injury (sprain) occurred as a player tried to absorb a check into the boards. Lastly the whiplash symptom came on a large collision in the neutral zone; the impact caused the player's head to whip back.

When indirectly comparing hockey to other sports, hockey may in fact not be as dangerous as originally depicted. It is an important distinction that this article is by no means attempting to directly compare the results with that of other studies on hockey or other sports. This would not be feasible due to the discrepancies with injury definition and the methods by which injury data is recorded. Instead, we compare how our study generally compares to a wide range of studies of popular sports in Canada, encompassing different ages and competitive levels within sports with large enrollments in Canada. This overview does provide a sense of what sports have higher injury rates in comparison to other sports with lower injury rates. The results reported in our study would fall within the sports that have reportedly lower injury rates. When discussing the most dangerous sports in terms of injury, the literature suggests that American Football has the most injuries, at 35.9 injuries per 1000 athletic exposures at the college level (Hootman, Dick & Agel, 2007). While a study by Zemper (1989) determined that of 100 college

football players 45.27 players will suffer an injury. Delee and Farney (1992) found similar results; they studied 4399 players at the high school level and found 2228 injuries accounting for more than 50% of the players had an injury that year. More startling is that of these numbers 137 required a hospital visit. Finally Delee and Farney (1992) found that the knee was the most injured anatomical site.

A second popular sport for children to participate in is basketball. In a study by Cumps, Verhagen and Meeusen (2007) it was found that college basketball players suffer 9.8 (8.5-11.1) injuries per 1000 athletic exposures. In an early high school study, McLain and Reynolds (1989) found that the mean time lost for a basketball injury for boys was 11.8 days. Meeuwisse, Sellmer and Hagel (2003) studied 318 college basketball players over two seasons only to find that 142 sustained an injury that season. A more startling statistic is that of the 318 players studied there were 215 injuries reported. The study found that 44.7% of players got injured during a basketball season, while some players were injured multiple times. The primary cause of injury was player to player contact in the key of the court. The ankle and then the knee were the most injured anatomical sites (Messina, Farney & Delee, 1999).

The largest participatory sport in Canada and the fastest growing sport at the moment is soccer (Canada Soccer, 2013). Soccer is a game synonymous with a high level of skill and limited injuries. In a study by Agel, Evans, Dick, Putukian and Marshall (2007) on college soccer they found 18.75 injuries for every 1000 athletic exposures. Another study by Nielsen and Yde (1989) found an incidence rate of 14.3 injuries per 1000 hours of game play at the high school level. A total of 109 injuries were seen of which 38 required a hospital visit and 6 knees required surgery. In terms of time lost 35% of injuries caused a loss of over a month and the rest ranged from a few days to a few weeks. The primary cause of injury was player to player

contact (31%). In another study on children to late adults performed by Lindenfeld, Schmitt, Hendy, Mangine and Noyes (1994) it was determined that for every 100 hours of play a player could expect 5.04 injuries while goalkeepers were slightly less at 4.2 injuries per 100 hours of game play.

The final sport that has a large enrollment rate in Canada is baseball. Baseball is a sport with limited body contact and the primary sources of injuries are the ball itself and overuse injuries (McFarland & Wasik, 1998). McFarland and Wasik studied 277college players and saw 52 injuries over the course of a season. This comes down to 5.83 injuries for every 1000 athletic exposures. It was found that 73% of the injuries resulted in less than seven days lost to injury while 25% resulted in more than 21 days lost. The majority of the injuries were sprains, strains and contusions and more than half were to the upper body.

By utilizing a wide range of studies with different ages and competitive levels it is possible to situate the results of this study in terms of its incidence of injury and overall danger. By doing this indirect comparison the most dangerous sport would be American football (35.9 injuries per 1000 athletic exposures), soccer (18.75 injuries per 1000 athletic exposures), basketball (9.8 injuries per 1000 athletic exposures), *hockey (8.19 injuries per 1000 athletic exposures)*, and finally baseball (5.83 injuries per 1000 athletic exposures). Without wishing to over generalize the findings presented in this study, the figure of 8.19 per 1000 exposures is noteworthy considering the amount of athletic exposures observed over the two years. At the very least it suggests that hockey might not be as dangerous as previously reported, especially when compared to other widely participated sports.

Injuries cannot simply be quantified in terms of frequency. Severity of an injury is just as important as the number of cases seen. In this study only 7 injuries caused an athlete to miss a subsequent game and there was only one hospital visit required of the 22 injuries. Not only did football have more injuries it had more serious injuries, 137 hospital visits (Delee & Farney, 1992). In soccer it was seen that of 109 injuries, 38 required a visit to the hospital and 6 of which required surgery (Nielsen & Yde, 1989). There is no data on injury severity for basketball in terms of hospital visits but from a study by Mclain and Reynolds (1989) found that the mean loss of time for an injury to a male adolescent was 11.8 days leading to an assumption that the injuries were significant. Meeuwisee, Sellmer and Hagel (2003) found that many players suffer from reoccurring injuries over the course of a season, and often times play through the pain only to make them worse. As for baseball it was found that 75% of injuries led to less than 7 days away from the sport while 25% resulted in more than 21 days missed (McFarland & Wasik, 1998). This could mean that baseball injuries when they do occur could be the most severe.

As stated earlier the literature depicts hockey as an aggressive and violent sport that leads to participant injury. This was not something the research team wished to reject when starting the research study. However after collecting the data, analyzing and discussing it amongst ourselves it was clear that what we had seen was not an aggressive and violent sport. In fact our research team observed the contrary with players displaying regard for other players' safety. There are numerous video clips obtained over the course of the study where players either slow down to deliver a less devastating blow or in other cases ask an opponent if they are okay after an incident. By qualitatively documenting aggressive and violent play, the research team could only agree on 21 instances where an aggressive or violent act took place which lead to an actual injury. Of the 21 instances, 4 discomforts were recorded and only 1 instance resulted in a player

missing time. It is interesting to note as stated earlier that 11 of the 21 instances of transgressive behaviour occurred on hitting from behind plays. These were all categorized as aggressive and violent acts but in some cases it is difficult to determine if the play developed accidentally. The remaining transgressive acts were carried out with the hockey stick in the form of slashes, spearing and butt-ending opponents. The main finding that is so crucial here is that only one classically defined injury occurred out of the 22 as a result of an aggressive or violent play. This would suggest that the majority of injuries occur on not only legal plays but unintentionally dangerous plays.

One of the main objectives of this study was to determine if injuries are occurring on acceptable plays within the rules of the sport, or if they are occurring on plays where players act outside of the rules in a dangerous manner. What is evident from the results is that of the 22 incidences of injury only 5 resulted in a penalty call. It is understood that penalty calls are subjective and up to the referee's discretion but it is evident that the majority of injuries occurred on plays deemed by officials to be legal. In fact of the 22 injuries 15 occurred on legal body-checking plays. Of the 15 injuries only 1 was an instance where a player attempted to deliver a body-check. This means that the majority of injuries occur on plays where a player receives a legal body-check from an opponent. The 5 injurious situations where a penalty was called was on a instance where body-checking was involved and not on stick plays such as slashing, hooking or spearing. This coincides with the literature that says that body contact is responsible for injuries in sport. The other 7 injuries occurred on blocked shots, overuse injuries and unlucky falls.

The fact that injuries are occurring on legal 'hockey plays' is of tremendous importance when attempting to move forward with injury prevention strategies. While this study indicates a

relatively low rate of injury, especially those of a serious nature, it is not the intention of the study to refute other scholarly findings that indicate a higher rate of injury. The research group supports efforts to make the game safer and this study offers important insight in doing so, largely because injuries are occurring on plays made within the rules. What this suggests is that it is not necessarily the reckless dangerous plays of youth that are causing injury, but rather well executed plays that the sport promotes. If that is the case, it is the enforcement of the rules themselves that need to be revisited if one wishes to reduce the rate of injury.

Conclusion

In this study, a total of 2687 athletic exposures were observed and recorded over the span of 90 hockey games. Of these 2687 athletic exposures our new definition found 181 injuries to include for discomfort, but only 22 classic incidences of injury where a player left the game and 7 of which missed subsequent games. When looking at violent or aggressive behaviour it was seen that only one of the 22 injuries in the study occurred on an aggressive play. 21 instances of aggressive or violence were documented that led to one classically defined injury and four discomforts. Injuries in hockey are occurring on legal plays without aggression or violence to blame.

When the results from the study were indirectly compared with other studies on injury from other sports it was determined that hockey was not inherently more dangerous. In fact in terms of injury per 1000 athletic exposures football was the most dangerous (35.9), followed by soccer (18.75), basketball (9.8), then our study on hockey (8.19) and finally baseball (5.83). From the limited sample presented here, it would appear that youth might not be the aggressive or violent sport the media and scholarly articles purport it do be.

Injury and more specifically aggression and violence in hockey have received considerable attention in the media over the past 25 years. The aim of this study was not to contradict these claims but rather to give an in-depth analysis of three teams and the injuries incurred over 90 games. Hockey was not seen to be aggressive or violent but it was apparent that children are being subjected to injury on plays deemed to be legal within the rules of the sport. To conclude the majority of epidemiological studies in sport do not involve direct game observations which are problematic. By conducting a study with qualitative methods it was possible to shed light on findings never found in previous literature. Not only can these findings aid in future research but it can challenge previous tacit assumptions within previous large epidemiological studies that were based on self-reported injury or hospital reports.

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Article Two

An Observation Analysis of the Contextual Factors that Lead to Injury in Ice Hockey

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Abstract

This article will discuss the results of a two year 90 game study, where the contextual factors that lead to competitive minor hockey injuries were observed in situ. Using a mixed-methods approach, the study followed three minor hockey teams in the Ottawa-Gatineau region over two sporting seasons to gain both a qualitative and quantitative assessment of injury. With the use of a direct observational approach combined with an extensive content analysis five contextual factors were found to be linked to injury frequency. These contextual factors included: (1) body-checking, (2) time of the game, (3) player's body mass, (4) position played, (5) and legal plays. Injuries were also broken down by anatomical site (head/neck, upper body and lower body) and the upper body proved to be injured most frequently and severely. With the use of a strong qualitative methodology many new factors of ice hockey injury were determined and perhaps can be used to make the game safer for young children to participate in body contact leagues.

Introduction

Ice Hockey, Canada's national winter pastime, has received a great deal of press recently [4]concerning players' high risk of injury. Known as a particularly aggressive sport, it is predominantly played by those under the age of nineteen (Emery, Kang, Schrier, Goulet, Hagel, Benson, Nettel-Aguirre, McAllister, Hamilton & Meeuwisse, 2010). It is a complex contact sport that demands physical, physiological, mental, technical, and tactical skills and the risk of injury is considerable (Emery et al., 2010). In 2008, Hockey Canada reported over 550,000 participants (Emery, Hagel, Decloe, & Carly, 2010). Canadian data suggest that hockey injuries account for up to 10% of the injuries suffered by adolescents (Emery et al., 2010). Research has shown that injury rates in hockey have increased each year since the 1970s (Molsa, Kujala, Nasman, Lehtipuu, & Airakinen, 2000). Considering the plethora of injuries Canadian youth are experiencing, it is imperative to gain an understanding of how and why injuries occur in order to work towards developing meaningful injury prevention strategies.

An extensive amount of quantitative and to a lesser extent qualitative research has been undertaken over the last few decades concerning injury in hockey (injury type, localization, and severity). Much less is known about risk factors and injury mechanisms. Many of the large epidemiological studies have reported staggering results about injury rates in youth and adult hockey populations without increasing an understanding of causality (Daly, Sim, & Simonet, 1990). The less frequent qualitative studies that have been published have focused less on injury and more on the culture surrounding sport and potential relationships to injury (Bernard, Trudel, Marcotte & Boileau, 1993; Daly, Sim, & Simonet, 1990). Much is known about the rates of injuries, less is known about how and why players are getting hurt.

[4] For the remainder of the article ice hockey will be referred to as hockey

The objective of this article was to identify different contextual factors that lead to hockey injury. Using a mixed methods approach, the study assessed predominant contextual factors that led to injury. The study followed three minor hockey teams in the Ottawa-Gatineau region. The contextual factors that were seen within the study range from the act of body-checking, time of game, body weight differentials, position played, anatomical position of injury, and whether injuries occur on legal or illegal plays. The combined quantitative and qualitative approaches utilized in this article provide novel insights about the nature and frequency of injury in youth hockey.

Injury Reporting.

To begin, it is important to first define what an injury is. Although there are many researchers from various scholarly domains studying injury in hockey, there is not an agreed upon definition of injury. In one prominent study by Dick, Agel, and Marshall (2007), injury is defined as:

> (1) a result of participation in an organized intercollegiate practice or competition and (2) required medical attention by a team certified athletic trainer or physician and (3) resulted in restriction of student-athlete's participation or performance for 1 or more calendar days beyond the day of injury. (p.174)

Another example of an injury definition comes from a consensus statement issued in 2006 by the sport of soccer where injury was defined in the broadest sense as any event occurring as a result of sport participation (Bahr & Engebretsen, 2011). It was then purposed that these events were classified by the medical attention that was needed to resolve the problem. Those that required assessment or treatment by a medical practitioner

were then considered to be injured. Injuries were then sub-divided further based on time lost from sport participation (Bahr & Engebretsen, 2011). Both definitions explore injury in the broadest sense leaving smaller injuries to go unnoticed and players to potentially hide pain. Furthermore classic injury definitions do not account for personal differences between players, sport specific injuries, and most importantly injuries that are not severe enough to miss time or require medical attention. Differences between players is important as some players may be unwilling to take themselves out of a game or encouraged by a coach, parent or teammate to play through pain. Some sports may require different definitions as each sport carries its own norms for injury. A contusion may be enough of an injury to stop a soccer player from participating but may not be enough to stop a hockey player. The difference in definitions impacts the rate of injury reported, but it also makes it difficult to compare injury studies. If an injury is only classified as an injury if it leads to time lost, it does not account for levels of physical trauma that are not severe enough to prevent participation.

Adding to this is the manner in which injuries are actually recorded. Studies that rely on voluntary reporting of injury either through medical reports, insurance claims or even team trainers do not account for players playing through pain, not disclosing an injury, or in some cases not aware an injury has occurred (especially as it pertains to concussions). But perhaps more importantly, secondary injury reporting tells us very little about how and why injuries are occurring. These different approaches to documenting injury in youth sport create important discrepancies between studies and cast doubt on general conclusions made about the nature and frequency of injury in youth sport (Fuller, Ekstrand, Junge, Anderson, Bahr, Dvorak, et al., 2006; Tegner & Lorentzon, 1991).

Agel, Dompier, Dick, and Marshall (2007) attempted to respond to this by taking an approach that deliberately strays from the voluntary retrospective, medical based reporting typically seen in large epidemiological studies. While still maintaining a quantitative approach, observational methods drive the research rather than relying on large (secondary) injury data banks from hospitals or insurance records. It is important to distinguish from voluntary reporting as some participants may decide to mask injuries in order to avoid time missed. It is important then to consider a definition outside of a purely medical model and consider injury more broadly to include less severe levels of physical trauma that lead to discomfort, not time lost. In order to account for discomfort, Dumas and Laforest (2009) developed an alternative definition of injury in their work on skateboarding injuries. In their study injury was defined as: “any accident that stopped the skaters from practicing, whether requiring First Aid or not” (p.23). In order to capture this type of injury, an observational component is clearly necessary; otherwise the cessation of activity would not be recorded. Furthermore, through this observational approach and by adopting a broader definition of injury researchers can identify contextual factors that lead to injuries or injurious situations. If steps are to be taken towards injury prevention, one needs to move beyond simply quantifying injury occurrences and rather explore the common situations that lead to them.

In 1997, the National Hockey League (NHL) developed its concussion study program after eight elite professional players were forced to retire prematurely due to repeated concussions and extended periods of post-concussion symptoms. NHL examples of this are Keith Primeau and both Lindros brothers. The league began to do neurological testing, experimentation with equipment, changing environmental factors (boards and glass) and looked

at mechanisms of injury through video analysis (Wennberg & Tator, 2003). The use of video adds a layer of analysis that provides an opportunity to describe the events leading up to an injury situation in game situations (Andersen et al., 2003). By combining video analysis with the other research tools such as observation, field notes, and injury grids, researchers have a more systematic and comprehensive method for documenting injury and identifying the contextual factors that lead to injury.

Methods

This study was part of a larger 3 year initiative involving both male and female hockey teams in Ontario and Quebec. Within this larger study the objective here was to determine what contextual factors within the game itself are seen during injurious plays. The second objective was to determine which anatomical sites are at a heightened risk for injury. A mixed method approach with an observational component was used to gain a deeper understanding of the context of hockey injury. This larger project consisted of a research team made up of University of Ottawa graduate students. The first year of the project involved examining the difference in injury occurrences between Pee-wee (11-12 year olds) body checking and non-body checking leagues. To do so one competitive body checking Ontario hockey team was chosen along with a competitive non-body checking Ontario girl's team and a Quebec team. Year two consisted of the culture and environment surrounding injury in girl's hockey. Year three was a comparative study between the different years of body contact initiation amongst Ontario (Pee-wee, 11-12 years old) and Quebec (Bantam, 13-14 years old) minor hockey teams. In this study only datra from years one and three will be presented.

Participants.

The study took place over two sporting seasons from 2009 to 2012. In the 2009-10 season a team from the Ottawa (Ontario) District Minor Hockey Association (ODMHA) was chosen at the competitive AA Pee-wee level. During the 2011-12 season another team from the ODMHA and the Association de Hockey Mineur de Hull (Quebec) (AHMH) were selected. The teams that were chosen for the study were a competitive AA Pee-wee team from Ottawa (11-12 years old) and a competitive Bantam BB team from Hull (13-14 years old). It is important to note that minor hockey in both provinces is open to male and female participants but in this study all three of teams were comprised of male players. League coordinators, coaches, trainers, parents and players consented to participate in the research study. Players were made aware of the study and their information was obtained prior to the beginning of the hockey season. Player's name, date of birth, position played, height and weight were used.

Games Studied.

For data collection purposes the research team followed each of the three teams from the beginning of the regular season through playoffs. There is one minor exception for the 2009-10 season in which the study began mid-season (because of delays getting research ethics approval) and therefore fewer games were documented. A total of 90 (66 regular season and 24 playoff) hockey games were documented between December 2010 and March 2012. Teams did participate in pre-season games, practices and tournaments but these were considered outside the scope of the study and were not observed. However injuries during tournaments were tracked by team trainers and noted by the research team but presented in the final results. Games were comprised of a total of two 15 minute stop time periods and a third 18 minute stop time period with a small pause between each period of play. Note that a total of 5 games were lost due to

technical errors with the video but field notes were available. The research team was comprised of graduate and undergraduate students from the University of Ottawa and were all trained on data collection techniques.

Data Collection Techniques.

What makes this epidemiological study different from many hockey injuries studies is its injury definition and how the data was collected. Instead of hospital records and retrospective reporting this study used a direct observational approach when it came to documenting injuries. By observing an entire game in situ it allowed the researcher to obtain higher quality data, interpretations and view rare and re-occurring circumstances (Dewalt & Dewalt, 2002). In order to observe 90 games this required extensive human resources in the form of graduate students and undergraduate volunteers. At any given game there were between 3 to 5 observers each stationed at different locations around the rink so each had a unique perspective of the game-play. Before each game an observer was given a note book for field notes, a pen, a glossary of terms and their definitions and an observation grid (See Appendix B). Field notes were intended to document what transpired on the ice and in the stands. The observation grid was adapted from Dumas and Laforest's (2003) study on skateboard injuries. This tool allowed the observer in a quick and efficient manner to categorize an injury in terms of its severity, time lost, aggressive behaviour, time of the game, score of the game and the ability to include detail about the injury as well. Games were also videotaped from a wide angle to be reviewed later. Parkkari, Kujala, and Kannus (2001) argue that "careful video analysis of the mechanisms of sports injuries would likely reveal new ways to decrease the number of injuries" (p. 993). After each game field notes and observation grids that were completed by the research team were collected and transcribed into a single document. Any irregularities were checked and confirmed using the video from the

game in question. Games were also reviewed in their entirety by at least one member of the research team to ensure nothing was missed during the attended game.

In addition to the field notes, observation grids and video post game injury assessments (PGIA) were used to obtain a better understanding of the injury's anatomical site and severity. This tool was given to the team's trainer before every game and he or she was instructed on how to fill them out (See Appendix C). PGIA's were to be filled out right after the trainer dealt with the injury and only if the player missed regular playing time. This ensured the injury was still fresh in the trainer's mind. The intention of the PGIA was not to gain a medical in-depth analysis but rather a quick assessment of the injury, which is not possible through observations made by researchers in the stands.

The PGIA guide was an adapted version of the Injury Surveillance Sheet (ISS) which was developed by Dick et al. (2007). The following modifications were made to the ISS based on previous hockey specific injury studies: categories for anatomical sites or injury and physiological trauma (Smith, Stuart, Wiese-Bjornstal & Gunnon, 1997); and a breakdown of areas on the ice surface (Gilbert & Trudel, 2000). Anatomical sites were used in order to classify injury, as developed by Smith et al. (1997). The study began with highly specific anatomical sites for injury however this proved to be difficult to decipher without a medical report so it was made into three more basic categories; head/neck, upper body (torso and arms), and lower body (below the waist). The physiological trauma categories include: contusion (bruise), sprain, strain, laceration, fracture, dislocation, and concussion.

PGIA's were useful for collecting data on anatomical sites of injury and when compared with the video afterwards it was easier to pinpoint the location affected and what caused the

injury. PGIA's only strengthened the link between injuries and the contextual factors that caused them.

Data Analysis/Content Analysis.

Once all the data was collected in the form of field notes, observation grids, PGIA's and videos this information was transferred to a Microsoft Excel spreadsheet. Categories such as athletic exposure, game date, player position, height/weight, location on ice, penalties, injury severity, mechanism of injury, etc (See Appendix F) were formulated to correspond with each athletic exposure. In total there were 63 tabs used to classify each individual injury. These 63 tabs were created by the research team with a combination of existing sport injury studies, personal hockey knowledge of the research team, as well as some added along the way from what was observed. These 63 tabs can be collapsed into 12 categories; game specifics, player position, injury severity, anatomical location of injury, injury mechanisms, penalties, periods, ice location, body mass, game-play, and descriptive observations. Every athletic exposure documented within the study (2681) was run through the 63 tabs to ensure nothing was missed by the research team. An athletic exposure was defined as anytime a player partook in a game. If each team had 18 players for the game in question there would be 36 athletic exposures for that game. This required a significant amount of time and resources over several months. Each tab was assigned a contextual factor and each variable within the factor was given a number from 0-3. In most cases the tabs were 0 for no and 1 for yes to confirm the contextual factor took place. For example if a play involved an injury the researcher would mark the athletic exposure as a 1. In another instance in order to classify the "principal point of contact" for a body-check, stick or puck, a researcher would input 0 for the head/neck, 1 for the upper body, 2 for the lower body and 3 for the back/spine. This type of process was done for 63 contextual factors for 2681

athletic exposures. Once this was compiled, each contextual factor and variable within was compared against the 181 injuries. Those contextual factors that continually were associated with injury were noted and turned into a percentage. Of the 12 categories 5 contextual factors proved to be involved in most injuries observed throughout the study and will be discussed in this paper.

Table 2 Contextual Factors

Table 2

Contextual Factors

Game Specifics	**Player Position**	**Injury Severity**	**Anatomical Site**	**Injury Mechanisms**	**Penalties**	**Period**	**Ice Location**	**Body Mass**	**Game-play**	**Descriptive Observation**	**Other**
Date	Forward	Injured	Head/neck	Body-checking	Penalty called	First	Open ice	Height	Puck situation	Play explanation	Outside circumstance
Player code	Defenseman	Discomfort	Upper body	Received check	Boarding	Second	In front of net	Weight	Hit by puck		
Athletic exposure	Goalie	Missed time returned	Lower body	Gave check	Hit to the head (2min)	Third	Behind net	BMI	Action with puck		
Game number		Missed time did not return		Boards	Hit to the head (4min)		Corners		Confrontation		
League		Missed game		Stick	Slashing		Along boards		Puck battle		
Team		Missed subsequent games		Stick deliberate	Tripping				Attentional focus		
Game significance				Stick accidental	Hit from behind (2min)				Initial point of contact		
				Puck	Hit from				Aggression/		

	behind (5min)	Violence
Incidental collision	Roughing	Body-check type
	Elbowing	
	High stick	

Note: These are the contextual factors the author used when observing injury in hockey

Once the content analysis was finalized the team of researchers performed inter-rater and intra-rater reliability tests to ensure the content analysis was reliable and valid. Three of the five research team members volunteered to perform this task. A total of eight games per team were chosen by a random number simulator. This accounts for 24 games of the 90 collected. Within each game that was selected by the simulator, each injurious situation was re-evaluated. Each member came in and reviewed the clips for each injury and filled out the 63 tab Microsoft Excel spreadsheet again. Two weeks later, the same tasks were performed but the injuries were randomized in a different order to discourage prior memory bias. Each of the three coders had by this time completed the test twice. These two sheets were compared against one another to determine intra-rater reliability as well as against the group to determine inter-rater reliability. In general there was excellent inter rater reliability with all three raters agreeing on the presence of 93.3% of contextual factors and other descriptors of plays.

Results

A total of 2681 athletic exposures were observed and recorded over the span of 90 hockey games involving three consenting teams and their opponents. Over the 90 games, opponents and consenting teams incurred 181 injuries. Each of the 63 potential risk factors for injury was compared against the number of injuries that were observed. Any category that repeatedly came up in an injurious situation was flagged. The total number of instances that a category was seen to coincide with an injury was shown in terms of a percentage. In the end five contextual factors were repeatedly identified as a major contributing factor to injury; (1) body-checking, (2) time of the game, (3) player's body mass, (4) position played, (5) and legal plays. Injuries were then categorized into the different anatomical sites that were inflicted; lower body, upper body, and head/neck.

1) Of the injuries that were recorded throughout the study 130 injuries (72%) occurred on body-checking plays. 112 injuries occurred due to a player receiving a body-check which accounted for (62%) of total injuries seen, whereas only 17 (9%) injuries occurred on plays in which a player attempted to deliver a body-check. Of these body-checking injuries 74 (41%) involved players making contact with the boards. The most dangerous place for a player to be was along the boards. While the second most frequent spot to be injured was in mid-open ice, with 48 (27%) injuries happening in this area of the ice. 60 (46%) injuries occurred when a player was focused on something other than the opponent and was body-checked—head down or watching the puck.
2) In the third period the research team observed a total of 82 injuries (45%) compared to 59 injuries (32%) in the second period and 38 injuries (21%) in the first period.
3) Both height and weight on their own did not correlate to injury, however when combined it was found that smaller players were more likely to be injured. It was found that 48.8% of all body-checking injuries were caused by a bigger player colliding with a smaller player. When players collide with similar size players it accounted for 39.5% of body-checking injuries and when larger players collide with smaller players it accounts for 11.6% of body-checking injuries.
4) The fourth contextual factor deals with playing position: goalie, defenseman or forward. Goalies incurred 4 (0.02%) injuries, defenseman 45 (24.9%) injuries and forwards incurred 132 (73%) injuries. When looking at positions and excluding goalies that do not partake in most contact, defenseman were (66%) less likely to get injured than their offensive counterparts.

5) The final contextual factor was majority of injuries occurred on legal plays according to the referee discretion. Of the 181 injuries only 33 (18%) occurred on plays where a penalty was called.

Anatomical Location

The anatomical sites for each of the injuries were categorized, indicating that 104 (57.4%) of all injuries were to the upper body. The head/neck accounted for 36 injuries (20%) and the lower body incurred 41 injuries (22.6%).

Discussion

The aim of this study was to gain a greater understanding of leading contextual factors that contribute to injury in youth competitive hockey. The secondary aim was to determine what anatomical sites are at a heightened risk for injury. The findings from this study coincide with the majority of published literature on hockey injury; body checking has a direct correlation to injury. It is important to note that this article utilizes the term body-checking to encompass Hockey Canada's steps three and four of the "Teaching Checking: A Progressive Approach" (2011) which are body contact and body-checking. Hockey Canada defines body contact as the active movement of the puck carrier to position his or her body between the puck and the opponent. While Hockey Canada defines body-checking as body contact used by the defending checker to stop attacking progress or to separate the carrier from the puck. In order to simplify the results both categories were compounded into one category known as body-checking. It was found that this contextual factor accounted for 130 injuries (72%) in the study. Of the 130 injuries directly attributed to body checking, 112 (87%) were caused as a result of receiving a body-check. Receiving a body-check puts players at an increased risk of injury for several observed reasons. First, in receiving body-checks players often make contact with the boards.

When bodies are moving at high speeds and come in contact with an immovable object, (hard surface, in this case a wall), injuries are likely to result. It was found that of all 130 injuries caused by body checking, 74 involved the boards and 60 involved a player focusing on some other task as opposed preparing himself for the ensuing contact. This includes a player having his head down attempting to maintain possession of the puck, or watching his pass or shot. Contact with the boards had the highest rate of injury compared to any other ice location. At the outset of the study it was presumed that open ice hits would prove to be a major cause of injury, however, it was play along the boards that proved most dangerous. To address this concern it would be advisable during the early stages of body checking to eliminate body checking along the perimeter of the boards (1.5 metres), which was where the majority of body checking injuries took place.

Staying within the larger category of body checking injuries, it was evident that players receiving a check are in a vulnerable position because of the myriad tasks the player is performing at the time. In order to receive a check (within the rules of the game), a player must have possession of the puck. While in possession of the puck players are often occupied with trying to keep the puck on their stick, looking for an available teammate or devising an individual scoring opportunity. The player delivering the check has only one focus, which is to successfully deliver the check. It was observed throughout the study and further confirmed through video analysis that players delivering body checks were able to prepare their bodies long in advance of the collision. With the two steps a player was given to deliver a body check it was observed that a player would lower his center of gravity, brace the core and often times raise his arms or shoulder to protect the head. On the other hand, players receiving a body check were not allotted this luxury and limited or no bracing was observed. These two steps allowed the

defender time to achieve optimum body awareness when delivering a body check but does not allow the same state of preparedness for the player receiving the check. The multiple tasks required of the puck carrier immediately makes this player more vulnerable to injury which from an injury prevention point of view demands that this player has sufficient skills prior to engaging in body checking hockey. With sufficient mastery of skating, puck possession, play making and puck protection, players will be better able to contend with the additional task of being physically prepared to receive contact from an opponent.

The second contextual factor that was directly linked to injury was the time of the game. Our study concluded that as the game progresses the risk of injury heightens. It was found that a player in the third period was 52% more likely to be injured than playing in the first period, and 27% more likely to be injured than playing in the second period. This is an interesting finding, as it would be presumed without taking into account for injury mechanisms that each period should carry a 33% likelihood of injury. Physical and mental fatigue could be a factor in the equation but there could be more. By the third period players often have received more physical trauma from body-checks, pucks and sticks than in previous periods. Players are more fatigued and the game has a heightened significance with little time remaining. Intensity and frustration are at an all time high which can lead to increased aggressive behaviour. With this, player conditioning is an important consideration when working towards injury prevention strategies, and teams/training staff should work with parents and players to develop/maintain optimal fitness levels throughout the season.

The third contextual factor was body mass differentials. The traditional body mass index (BMI) equation was used to determine a player's mass, which is a player's weight in kilograms divided by his height in metres squared (weight/height^2) (Brooks, Fahey & Baldwin, 2005). This

could only be done for the *three* teams that were a part of the study as access to opponent teams' body weight and height data was unavailable. By looking at BMI it was found that players who were smaller incurred more injuries than their larger counterparts. This does not seem surprising, that smaller players are more likely to be hurt than their larger counterparts. In terms of height differentials it was evident looking at videos that a taller player often made contact with the smaller players head or upper chest, while players of similar height or greater height would absorb checks with their legs or torso. It is hypothesized that this is why there are more upper body injuries within the study. When looking at pure mass of a player it was evident that heavier players were able to absorb a hit more efficiently than their lighter opponents. When combining these two factors it became clear that smaller players are at a heightened risk for injury when playing body contact hockey.

When looking at the fourth contextual factor in the results, it was evident that on average, defensemen were the larger players on the ice surface and accounted for fewer injuries than forwards. The average height and weight for all three leagues was 155.05 cm and 47.35 kg for any given position. Forwards average weight was 46.39kg and 153.41cm tall. Defensemen accounted for 45 of the total 181 injuries while forwards accounted for 132 injuries. Taking into account that a regular hockey team carries 6 defensemen and 12 forwards the probability of forwards on a team getting injured would logically seem higher, yet defenseman tend to play more minutes which might increase their risk of injury (three lines of forwards means playing every third shift, where two pair of defence means playing every second shift). The majority of the literature suggests that goalies incur the most minor injuries and defenseman face the most severe injuries while forwards fall in between in both categories (Emery et al., 2011; Lorentzon, Wedren & Pietila, 1988; Molsa et al., 2000). The data here suggests that forwards have the most

minor, moderate and severe injuries. Based on field notes, observation grids, PGIA's, and video this could be the case for several reasons. In terms of game-play most teams at this level play a puck possession type game. This means that forwards carry the puck into the offensive zone to set up an attack rather than dumping the puck in past the defenders in an attempt at retrieval. In a dump-in style, defensemen are placed at risk because they must turn their backs to the oncoming fore-checker who will attempt to separate the player from the puck by hitting him into the boards. However in a puck possession game, forwards will try to shield the puck from the defenders, often times by the boards which allow the defenseman the opportunity to deliver body checks rather than receive them. As stated earlier more injuries occur to those receiving body checks. Forwards were also the players subjected to what they call in the sport of hockey a "suicide pass." This term is used when a player going up the ice makes a pass to a teammate that requires him in open ice to look behind him to receive the pass. This creates a vulnerable position for the receiver of the pass as an opponent can step up and deliver a crushing blow that is undetected. Since the teams that were followed were in their introductory year of body checking, they had not adjusted to a style of game where suicide passes were dangerous.

The last observed contextual factor found involved penalty calls. A penalty is a mode of action a referee takes when a player commits an infraction of the leagues rules and regulations. During the course of this research it was found that penalty calls were made on only 18% of injuries. It needs stating that there is a degree of subjectivity to issuing a penalty in hockey. While it is certain that various calls over the course of this study could have been disputed, this type of assessment arguably adds another level of subjectivity rather than certainty about if a foul was committed. With this it was determined that the analysis conducted here would work from calls made by on-ice officials, which were verified at the conclusion of each game with the

official game sheet. What was clear, however, were the overwhelmingly high number of injuries that occurred on plays not penalized, or plays deemed legal by on ice officials. The question arises, are injuries occurring on "hockey plays" rather than on transgressive or illegal plays? If so do the rules themselves need to be changed in order to prevent injury?

As stated earlier, the issue of head injury in hockey is a growing concern for parents and is receiving considerable attention in the media. Contrary to several studies (Boden & Jarvis, 2009; Koh, Cassidy & Watkinson, 2003) and media reports, however, our study found that the head was the least injured body location. When examining the anatomical location of injury, it was found that the upper body, from hips to neck including the arms, was the bodily location most frequently injured. The most severe, moderate and minor injuries were seen in this location. In fact, in the two seasons and *three* teams that were studied, there was only one confirmed concussion and four suspected incidences of concussions. While access to medical reports from the opposing teams was unavailable, a much lower incidence of head injury was observed than expected. Some of this could be attributed to the newly implemented head shot rule in the 2011-2012 minor hockey league season. What was evident through observation and video analysis was that most of the initial contact from body-checking was absorbed by the upper body. Players tended to brace themselves when going into the boards with their arms, which led to contusions, dislocations, and fractures.

Limitations

It should be noted that there are some limitations to this study which must be taken into consideration when interpreting the results. In order to overcome the underreporting that is seen in other injury studies a direct observational approach was employed. This type of methodology requires a significant amount of time and resources and due to the size of the research team a

small sample size of three teams over two seasons was all that was feasible (Gee, 2011). Larger studies that use medical reporting and hospital records can generate generalizations based on the sheer volume of data points they can accumulate. Another limitation to the study is human error. Three athletic trainers, one for each team, were entrusted with filling out injury grids the moment a player was injured for a more in-depth analysis. However, since the research team was not with the athletic trainers at all times it is not known whether they were completed at the exact time of the injury. This could lead to trainers forgetting key information about the injury and valuable information could be lost or altered. The last limitation to the study was the lack of access the research team had to opposing team's coaches, parents, and players. Therefore injuries to opposing players are not known to the same extent as the teams that were chosen to participate. So in the case of severe injuries, for example, the research team does not know how many games were missed.

Conclusion

In this study, 72% (130/181) of all injuries observed were a direct result of body checking, with 112 injuries caused as a result of receiving a body-check. It was also observed that the surrounding boards were the most dangerous location on the ice, accounting for 74 injuries. It was found that as the game progresses in terms of time on the clock, the game becomes more dangerous for its participants. The third period had more injuries than any other period and the second period had more than the first. The fourth finding was that smaller players in terms of body mass are more likely to be injured, while their larger counterparts are less likely to be injured. Since forwards tend to be smaller than defenseman, more injuries were seen at the forward position. Finally 82% of injuries observed occurred on legal plays, where no penalty was

called. Additionally it was found that the upper body region incurred the most injuries compared to the head/neck and lower body

Injury in youth hockey has received increased public attention over the past decade. Even in leagues without contact, parents are hesitant to allow their child to compete in a sport that is now synonymous with injury. The issue has only intensified with the recent rash of concussions in the NHL, i.e. Sydney Crosby, Marc Savard, and Claude Giroux. While there are many studies confirming that there is a high rate of injury in youth hockey, very little is being done to make concrete steps towards injury prevention. While documenting the rate of injury is important, it is necessary to start gaining a deeper understanding of the contextual factors that are causing injuries. Retrospective, medical based studies that have been performed to date are forcing people to question the safety of the sport, while providing little in the way of preventative solutions. In this study important first steps have been made to assess how contextual factors such as: body-checking, time of the game, position choice, height and weight differentials, and if injuries are occurring on legal play. It was also determined which anatomical locations were most frequently and severely being injured. These factors must be understood within the larger context of youth body checking hockey, which to a certain extent normalizes injury. It could also be seen by the very few injuries that were documented that hockey is not intrinsically dangerous and injuries are not just a part of the game. This project provides important first steps in understanding how and why youth are getting hurt in minor hockey. By utilizing a direct observational approach, it provides some direction in moving forward in developing ways to help reduce the rate of injury in Canadian youth hockey.

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Part III: Conclusion

Chapter Four

Conclusion

Injury in youth ice hockey has received increased public attention over the past decade. Even in leagues without contact, parents are hesitant to allow their child to compete in a sport that is now synonymous with injury. This fear only intensified with the recent rash of concussions scares in the NHL to household names such as Sydney Crosby, Marc Savard, and Claude Giroux. While there are many studies confirming that there is a high rate of injury in youth hockey, very little is being done in terms of learning what is required to assist in preventing injuries.

Previous epidemiological studies performed on hockey have enumerated injuries based on retrospective self-reporting and hospital records. While knowing the rate of injury is important, this form of injury reporting is problematic in that it typically does not account for injuries that do not involve time lost or medical attention, players playing through injuries and personal perceptions on what an injury truly is. As a result, these studies tend to contribute media hysteria about the dangers of the sport without properly understanding and seeking ways to reduce their frequency and severity.

While documenting the rate and severity of injury is important, it is necessary to start gaining a deeper understanding of the contextual factors surrounding each injury. Only then can progressive and meaningful strategies be introduced to help mitigate the risks of injury, whether it be around potential rule changes, fitness training, skill acquisition and or on-ice safety mechanisms to help prepare players for optimal playing experiences. In order to take steps in attaining this information, this thesis utilized a mixed methods approach to continue to document injury but also record situational factors that contribute to injury. With the use of in game

observations, field notes, observation grids, post game injury assessments (PGIA), and video recordings this was achieved. By attending 90 hockey games and taking detailed field notes that could be compared against video evidence, this thesis provides important first steps in understanding the 'how' and 'why' injuries are occurring.

Just as important, however, is that this thesis moves beyond typical injury definitions utilized in larger epidemiological studies. In this study each and every injury from a slight discomfort to a severe injury was catalogued and reviewed with the participating teams. This wider injury definition accounts for situations where players receive some form of physical trauma that players are encouraged to play through and go in undetected in other studies. There is a potential cumulative effect of these minor injuries that could either lead to more serious injury or simply taint the playing experience, which could impact drop-out/participation rates. This offers important areas for future research which focuses on player experiences and factors contributing to decisions to continue playing the game or drop out from the sport.

The objective of this study was to detail the contextual factors that lead to injury and determine the anatomical sites that are most often afflicted by injury in hockey. Contextual factors such as body checking and more specifically receiving a body-check can be correlated with higher injury occurrences. Of the 181 injuries observed within the study, 130 (72%) occurred on plays involving the act of body checking. 112 injuries (62%) occurred on plays where a player was receiving a body check. It would be expected that each period should have similar incidences for injury from a mathematical perspective. However the study found that the third period had 82 injuries (45%). While height and weight on their own did not show any significance it was observed that when bigger players come in contact with smaller players, smaller players are often the ones getting hurt. Contrary to numerous scholarly papers (Emery et

al., 2011; Lorentzon, Wedren & Pietila, 1988; Molsa et al., 2000) that show goaltenders with the most minor injuries and defenseman with the most severe injuries, the data collected in this study did not support these findings. In total goaltenders incurred 4 injuries, defensemen had 45 and forwards had a total of 132 injuries. Not only did they occur more frequently but they were also the more severe injuries. Another interesting fact that was found throughout the study was that the majority of injuries (82%) occurred on legal hockey plays. If players are getting injured on plays deemed acceptable in the sport it suggests that rules themselves are not protecting the players. Lastly in terms of anatomical sites of injury, it was found that the upper body was injured most often (57.4%) followed by the lower-body (22.6%) and finally by the head/neck (20%).

Hockey has received considerable criticism in recent media reports concerning violence and rates of injury. This study does intend to entirely refute these claims, but it does suggest that these claims should be revisited. The study followed three distinct hockey teams participating in their first year of body-checking. Over the course of 90 games 2687 athletic exposures were documented. Of these athletic exposures there were 90 incidences of discomfort, 65 incidences of shifts missed and return to play, 22 classically defined injuries where a player missed the rest of the game. Of the 22, 7 resulted in a player missing subsequent games totally 27 man games lost. The 7 major injuries included: one fractured clavicle; one fractured wrist; one fractured ankle; two sprained wrists; one shoulder contusion; and one player with reported whiplash symptoms. The study also used an observational tool to assess aggressive and violent behaviour. Only 21 injuries of the 181 occurred on plays deemed aggressive or violent. Furthering the observed notion, that injuries are occurring on legal non-aggressive hockey plays.

When comparing the sport of hockey against other widely played youth sports it was found in the study that it did not have a high rate of injury. Using the injury definition of hospital reporting and time lost due to injury as seen in the majority of epidemiological research in sport it was possible to compare the data from the study against other injury research in other major sports. According to Hootman, Dick and Agel (2007) American football has been shown to carry the greatest risk of injury, 35.9 injuries per 1,000 athletic exposures. The second sport a youth is most likely to be injured in is soccer with 18.75 injuries per 1,000 athletic exposures (Agel et al., 2007). In third is the sport of basketball with 9.8 injuries per 1,000 athletic exposures (Cumps et al., 2007). In fourth position would be hockey according to the results collected in our study, 8.19 injuries per 1,000 athletic exposures. Baseball follows in last with 5.83 per 1,000 athletic exposures (McFarland & Wasik, 1998).

It is widely known that hockey holds a special place within the culture of Canada, whether it is in terms of international play or at the local grassroots level. During the Vancouver 2010 Olympics TSN (2010) reported that the Sunday afternoon gold medal game was viewed by a record 16.6 million Canadians which qualifies as the most-watched television event in Canadian history. As such an important part of Canadian identity (Robidoux, 2002) it is important to ensure the integrity of the sport and the citizens have the right to participate in the sport safely and in the most positive environments. While recent scientific and media reports exposing the potential for injury warrant critical examination, they should also be accompanied with efforts to works towards making the game safer for its participants. The objective of this thesis was to uncover the contextual factors that lead to injury so that a greater understanding of injury could be realized. With this knowledge it is then possible to address these issues in the form of rule changes and greater player awareness of the dangers involved. With the findings

presented here, potential directions for making the game safer are offered in hope of achieving what Hockey Canada claims as its mission and mandate: “Lead, Develop, and Promote Positive Hockey Experiences” (Hockey Canada, 2013).

Part IV: References

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Part V: Appendices

Appendix A: Ethics Approval Letters

File Number: H10-09-03 Date (mm/dd/yyyy): 03/06/2012

Université d'Ottawa University of Ottawa
Bureau d'éthique et d'intégrité de la recherche Office of Research Ethics and Integrity

Ethics Approval Notice

Health Sciences and Science REB

Principal Investigator / Supervisor / Co-investigator(s) / Student(s)

First Name	Last Name	Affiliation	Role
		Health Sciences / Human Kinetics	Principal Investigator
		Health Sciences / Human Kinetics	Co-investigator
		Health Sciences / Human Kinetics	Co-investigator
		Health Sciences / Human Kinetics	Co-investigator

File Number: H10-09-03

Type of Project: Professor

Title: Comparative Study of Injury in Youth Competitive Hockey in Quebec and Ontario

Renewal Date (mm/dd/yyyy)	Expiry Date (mm/dd/yyyy)	Approval Type
12/01/2011	11/30/2012	Ia

(Ia: Approval, Ib: Approval for initial stage only)

Special Conditions / Comments:

The REB has reviewed and approved the following modification:

Research design: The researchers are adding an anthropomorphic evaluation, a functional movement screen evaluation, a fitrodyne evaluation for speed and power and a jump and land test. Players who participate will be shown corrective exercises and proper hockey warm-up;
Consent and Assent forms: They have been modified to include the new measures.

File Number: H10-09-03 Date (mm/dd/yyyy): 03/06/2012

Université d'Ottawa University of Ottawa
Bureau d'éthique et d'intégrité de la recherche Office of Research Ethics and Integrity

This is to confirm that the University of Ottawa Research Ethics Board identified above, which operates in accordance with the Tri-Council Policy Statement and other applicable laws and regulations in Ontario, has examined and approved the application for ethical approval for the above named research project as of the Ethics Approval Date indicated for the period above and subject to the conditions listed the section above entitled "Special Conditions / Comments".

During the course of the study the protocol may not be modified without prior written approval from the REB except when necessary to remove subjects from immediate endangerment or when the modification(s) pertain to only administrative or logistical components of the study (e.g. change of telephone number). Investigators must also promptly alert the REB of any changes which increase the risk to participant(s), any changes which considerably affect the conduct of the project, all unanticipated and harmful events that occur, and new information that may negatively affect the conduct of the project and safety of the participant(s). Modifications to the project, information/consent documentation, and/or recruitment documentation, should be submitted to this office for approval using the "Modification to research project" form available at:
http://www.rges.uottawa.ca/ethics/application_dwn.asp

Please submit an annual status report to the Protocol Officer 4 weeks before the above-referenced expiry date to either close the file or request a renewal of ethics approval. This document can be found at:
http://www.rges.uottawa.ca/ethics/application_dwn.asp

If you have any questions, please do not hesitate to contact the Ethics Office at extension 5841 or by e-mail at: ethics@uOttawa.ca.

Appendix B: Observation Grids 2009-10 and 2011-12

2009-2010 Injury Study Observation Grid

Team Name:
Game Number:_____
Player Name:_____
Date:_____

Appendix 1: Observation Grid

	Injury severity using first aid criteria: (1) Slight injury: Need comforting; (2) Medium injury: First aid, minor injury; (3) Severe injury: First aid, major injury; (4) Very severe injury: Medical attention needed	**Injury severity in terms of time missed:** (1) Missed shift; (2) Missed period; (3) Missed game; (4) Missed games	**Transgressional actions leading to injury:** (1) Instrumental transgressional; (2) Instrumental non-transgressional	**Enumerating causation/mechanisms of injury:** (1) Contact with player; (2) Contact with stick; (3) Contact with puck; (4) Contact with ice; (5) Contact with boards
Upper body injury				
Lower body injury				

Observation Grid **2011-2012** Game: Date:

Team: Player # Game Time: Period:	Injury is defined as: any physical trauma . . .whereby a player: (1) Is in discomfort; (2) Missed playing time but returned to the current game; (3) Missed playing time and did not return to the current game; (4) Missed subsequent game(s)	Injury severity in terms of time missed: (1) Missed shift; (2) Missed period; (3) Missed game; (4) Missed games: #_____	A)Transgressional* actions leading to injury: (1) Instrumental transgression; (2) Instrumental non-transgression B) Was a penalty called on the play? Y/N -If 'Yes', what penalty?	Enumerating causation/mechanism of injury: (1) Contact with player; (2) Contact with stick; (3) Contact with puck; (4) Contact with ice; (5) Contact with boards (8) Other:	Situational factors of injury:
Upper body injury					
Head					
Lower body injury					

*Transgression: nonconformity with rules Instrumental: physical actions tied to game play

Appendix C: Post-Game Injury Assessment (PGIA)

Post-Game Injury Assessment

Assessment Criteria:

Any player who, as result of unwanted physical trauma, **misses a regular playing shift** away from game play qualifies for the implementation of the Post-Game Injury Assessment (PGIA). The PGIA is to be completed at the completion of the game in which a player was tended to by the team trainer. It is the team trainer's responsibility to complete the PGIA and submit it to the researcher group within one game of the sustained injury.

Date:_____(m/d/y)

Team Name:_____

Game Number:_____

Player Name:_____

Age:_____(m/d/y)

Height:_____(inches)

Weight:_____(lbs)

1. What was score of game at time of injury:_____
2. At what place did this injury occur?
    a. Home
    b. Away
    c. Neutral site
    d. Other:_____
3. Injury occurred during:
    a. First period
    b. Second period
    c. Third period
    d. Other:_____
4. Injury is a:

a. New injury sustained in 1) Practice or 2) Game
b. Previous injury from this season sustained in *practice* and aggravated/made worse in the current game
c. Previous injury from this season sustained in a *game* and aggravated/made worse in the current game
d. Recurrence/aggravation of injury from previous season (Hockey)
e. Recurrence of other sport injury and what sport:_____
f. Recurrence of non-sport injury

5. The injury involved:
    a. Collision with other player
    b. Collision with boards
    c. Collision with other player and boards
    d. Collision with ice
    e. Collision with other player and ice
    f. Contact with stick or puck
    g. Body check given
    h. Body check received
    i. No apparent collision or contact (other):_____

6. The injury involved:
    a. Skating with head down/unaware of surroundings
    b. Retrieving puck from dump in
    c. Cutting into middle of ice
    d. Top of crease confrontation
    e. Other_____

7. Was the injury an:

    a. Instrumental transgression (physical action tied to game play; non-conformity with the rules)
    b. Instrumental non-transgression (physical action tied to game play; conformity with the rules)

8. Was there a penalty involved in the play that caused the injury?
    a. Yes, what penalty:_____
    b. No

9. Was the injury:
    a. Musculoskeletal or specific body part injured
        i. Knee
        ii. Thigh groin
        iii. Shoulder
        iv. Hip

v. Arm/elbow
vi. Head
vii. Spine
viii. Chest/rib
ix. Fingers
x. Chin
xi. Wrist

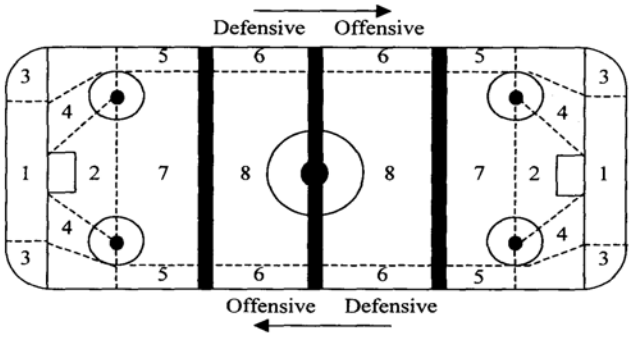
b. Less specific

i. Contusion, where:_____
ii. Sprain, where:_____
iii. Strain, where:_____
iv. Laceration, where:_____
v. Fracture, where:_____
vi. Dislocation, where:_____
vii. Concussion, how severe:_____

10. Position played at time of injury

a. Center
b. Left-wing
c. Right-wing
d. Left Defense
e. Right Defense
f. Goalie

11. Which area best represents where the injury occurred:



(*Gilbert & Trudel, 2000, p. 295)

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Appendix D: Ethics Recruitment Forms

Université d'Ottawa · University of Ottawa

Faculté des sciences de la santé
École des sciences de l'activité physique

Faculty of Health Sciences
School of Human Kinetics

Monsieur

Président

Bonjour Monsieur,

Nous vous contactons à titre de membres de l'*International Ice Hockey Research Academy* de l'Université d'Ottawa. La mission de l'Académie est de promouvoir le développement du hockey à travers des stratégies de recherche innovatrices qui visent à optimiser l'expérience de jeu pour les joueurs et les joueuses de tous les niveaux et de tous les âges. Un de nos champs de recherche est la prévention des blessures. Nous en sommes présentement à élaborer, en partenariat avec Hockey Canada, un programme de recherche permettant de surveiller et de mieux comprendre les blessures dans le hockey mineur. Plus précisément, nous cherchons à établir une étude au niveau Peewee AA et Bantam BB compétitifs dans la région d'Ottawa et Hull (respectivement) afin d'étudier la prévalence de blessure dans les ligues avec contact à différents âges de l'introduction.

Nous aimerions établir un partenariat avec l'Association de Hockey Mineur de Hull afin d'amasser des données à l'occasion de la deuxième phase de cette étude.

L'objectif général de cette étude est d'optimiser l'expérience hockey des participants. Lors de cette étude, nous prévoyons observer et enregistrer sur vidéo toutes les parties des ligues ciblées et réaliser des évaluations des blessures survenues afin de:

A. consigner les comportements conduisant à des situations de blessures ou de blessures potentielles;
B. enregistrer les blessures à mesure qu'elles se produisent en situation de jeu; et de
C. fournir des détails contextuels à propos des situations de blessures afin de mieux comprendre comment et pourquoi les blessures surviennent.

Les co-chercheurs seront responsables du travail d'observation sur le terrain, de l'analyse des vidéos et de l'évaluation des blessures. La participation à l'étude implique de contribuer à un système de déclaration des blessures qui vise à enregistrer des données sur les blessures survenues au cours de la partie. La déclaration de blessures se fait par le biais des joueurs, qui rapportent eux-mêmes toute blessure survenue au cours d'une partie et répondent à quelques questions sur cette blessure. Les joueurs qui ont été identifiés comme impliqués dans une situation de blessure, mais qui ne l'ont pas rapporté, pourraient être approchés pour qu'ils répondent à des questions sur la situation observée par les chercheurs.

Avant le début de quelque travail de terrain que ce soit, nous vous aimerions vous rencontrer afin de discuter de la possibilité de réaliser notre recherche auprès de votre organisation.

Si cette initiative vous intéresse, nous aimerions alors vous rencontrer pour discuter avec les équipes et les entraîneurs qui pourraient être intéressés dans notre étude. Nous tiendrons ensuite une rencontre avec les entraîneurs potentiel. En outre, pendant le camp d'entraînement ou après la formation de l'équipe, nous nous réunirons avec les entraîneurs, les parents, et les joueurs suivant une pratique de leur choix. Nous expliquerons : la nature de notre étude, les exigences liées à la participation à celle-ci, de même que les avantages, les risques potentiels et les résultats anticipés associés à cette étude. Nous répondrons en outre à toute autre questions. Nous fournirons également nos coordonnées au cas où les personnes rencontrées aimeraient nous contacter en privé. Notre but est de faire en sorte que toutes les personnes impliquées se sentent aussi confortables que possible et nous prendrons toutes les mesures nécessaires à la réalisation de ce but.

Il est important de noter que la participation à cette étude est entièrement volontaire et les participants peuvent se retirer de l'étude à tout moment. De plus, l'anonymat et la confidentialité sont garantis pour tous les participants. Aucune information recueillie ne sera transmise directement à quiconque dans l'association de hockey. Les résultats de cette recherche seront partagés par le biais de documents publiés et des présentations publiques, notamment auprès de Hockey Canada, de l'AHMH et de l'Ottawa District Minor Hockey Association, le tout dans le but de réduire la prévalence et la sévérité des blessures dans le hockey mineur. Pour toute question, n'hésitez pas à communiquer, à tout moment, avec le Service de subventions de recherche et déontologie de l'Université d'Ottawa

Salutations distinguées

International Ice Hockey Research Academy
Université d'Ottawa
Tél:
Courriel :
Télécopieur:

Université d'Ottawa · University of Ottawa
Faculté des sciences de la santé
École des sciences de l'activité physique
Faculty of Health Sciences
School of Human Kinetics

President

Dear:

We are approaching you at this time as members of the International Ice Hockey Research Academy at the University of Ottawa. The mission of the Academy is to promote the development of hockey through innovative research strategies aiming to optimize playing experiences for male and female players of all abilities and skill levels. One of the targeted areas of research is injury prevention and in partnership with Hockey Canada we are constructing a research program to properly monitor and understand injury in youth hockey. More specifically, we are seeking to establish a study at the Peewee (AA) and Bantam competitive levels (BB) in the regions of Ottawa and Hull (respectively) to study the prevalence of injury in body checking leagues with different ages of initiation.

Our intention is to form a partnership with the Ottawa District Minor Hockey Association in order to gather observational data in the second phase of this study.

The general aim of this study is to optimize participants' hockey experiences. Through this study we intend to observe and videotape all league games and conduct post-game injury assessment to:

A. record all on ice behaviour that either leads to injury or potential injury;
B. enumerate injuries as they occur in playing situations; and
C. provide contextual details about injury situations to better understand how and why injuries are occurring.

The co-investigators (Stephen Adams, MA, MM. Matthew Davey and Mitch Green) will be responsible for the observational fieldwork, video analysis, and injury assessments. Injury reporting would consist of players self-reporting any injury incurred during games and answer a brief list of questions pertaining to the injury. Players who have not come forward but who were identified as being involved in an injurious

situation may also be approached and be asked to answer questions pertaining to the situation observed during the game.

Prior to any fieldwork we would like to meet you to discuss the possibility of doing our research with your organization. If this initiative appears to be of interest to you, we would then like to meet and discuss this with teams and coaches who might be interested in the study. We will then hold a meeting with potential coaches. Moreover, during training camp or after team selection, we would meet with coaches, parents, and players following a practice of their convenience. At that point we will explain what is involved in the study, what participation would consist of, the benefits of the study, potential risks, proposed outcomes, and any other questions they may have. We will also provide our contact information if they wish to contact us privately. It is our aims to make everyone involved feel as comfortable as possible and to take any measure we can to ensure such goals are met.

It is important to note that participation is voluntary and they can withdraw at anytime.

Furthermore, all participants of this research will be guaranteed complete anonymity and confidentiality and any information collected will not be shared directly with anyone else in the hockey organization. The findings for this research would be shared via public lectures and published documents including presenting the findings to Hockey Canada, the Ottawa District Minor Hockey Association, and l'Association de Hockey Mineur de Hull, to help reduce the prevalence and severity of injury in youth hockey. If you have any questions at any point, please contact the Office of Research Services, University of Ottawa.

Sincerely,

University of Ottawa
Tel:
Fax:

Madame/Monsieur,

Nous vous contactons à titre de membres de l'*International Ice Hockey Research Academy* de l'Université d'Ottawa. La mission de l'Académie est de promouvoir le développement du hockey à travers des stratégies de recherche innovatrices qui visent à optimiser l'expérience de jeu pour les joueurs et les joueuses de tous les niveaux et de tous les âges. Un de nos champs de recherche est la prévention des blessures. Nous en sommes présentement à élaborer, en partenariat avec Hockey Canada, un programme de recherche permettant de surveiller et de mieux comprendre les blessures dans le hockey mineur. Plus précisément, nous cherchons à établir une étude au niveau de Peewee (AA) et Bantam (BB) compétitif dans la région d'Ottawa et Hull (respectivement) afin d'étudier la prévalence de blessure dans les ligues avec des mise en échecs à différents âges de l'introduction. Nous aimerions établir un partenariat avec *l'Association de Hockey Mineur de Hull* et le Ottawa District Minor Hockey Association afin d'amasser des données à l'occasion de la deuxième phase de cette étude.

L'objectif général de cette étude est d'optimiser l'expérience hockey des participants. Lors de cette étude, nous prévoyons observer et enregistrer sur vidéo toutes les parties des ligues ciblées et réaliser des évaluations des blessures survenues afin de:

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Les co-chercheurs seront responsables du travail d'observation sur le terrain, de l'analyse des vidéos et de l'évaluation des blessures. La participation à l'étude implique de contribuer à un système de déclaration des blessures qui vise à enregistrer des données sur les blessures survenues au cours de la partie. La déclaration de blessures se fait par le biais des joueurs, qui rapportent eux-mêmes toute blessure survenue au cours d'une partie et répondent à quelques questions sur cette blessure. Les joueurs qui ont été identifiés comme impliqués dans une situation de blessure, mais qui ne l'ont pas

rapporté, pourraient être approchés pour qu'ils répondent à des questions sur la situation observée par les chercheurs.

Avant le début de quelque travail de terrain que ce soit, nous vous aimerions vous rencontrer afin de discuter de la possibilité de réaliser notre recherche auprès de l'équipe de votre enfant. Lors de cette rencontre, nous expliquerons : la nature de notre étude, les exigences liées à la participation à celle-ci, de même que les avantages, les risques potentiels et les résultats anticipés associés à cette étude. Nous répondrons en outre à toute autre question. Nous fournirons également nos coordonnées au cas où les personnes rencontrées aimeraient nous contacter en privé. Notre but est de faire en sorte que toutes les personnes impliquées se sentent aussi confortables que possible et nous prendrons toutes les mesures nécessaires à la réalisation de ce but.

Il est important de noter que la participation à cette étude est entièrement volontaire et les participants peuvent se retirer de l'étude à tout moment. De plus, l'anonymat et la confidentialité sont garantis pour tous les participants. Aucune information recueillie ne sera transmise directement à quiconque dans l'association de hockey. Les résultats de cette recherche seront partagés par le biais de documents publiés et des présentations publiques, notamment auprès de Hockey Canada, de *l'Association de Hockey Mineur de Hull* et du Ottawa District Minor Hockey Association, le tout dans le but de réduire la prévalence et la sévérité des blessures dans le hockey mineur. Pour toute question, n'hésitez pas à communiquer, à tout moment, avec le Service de subventions de recherche et déontologie de l'Université d'Ottawa.

Salutations distinguées,

International Ice Hockey Research Academy
Université d'Ottawa
Tél:
Courriel :
Télécopieur:

Dear Sir/Madam:

We are approaching you at this time as members of the International Ice Hockey Research Academy at the University of Ottawa. The mission of the Academy is to promote the development of hockey through innovative research strategies aiming to optimize playing experiences for male and female players of all abilities and skill levels. One of the targeted areas of research is injury prevention and in partnership with Hockey Canada we are constructing a research program to properly monitor and understand injury in youth hockey. More specifically, we are seeking to establish a study at the Peewee (AA) and Bantam (BB) competitive levels in the regions of Ottawa and Hull (respectively) to study the prevalence of injury in body checking leagues with different ages of initiation. Our intention is to form partnerships with the *Ottawa District Minor Hockey Association* and l'Association de Hockey Mineur de Hull in order to gather observational data in the second phase of this study.

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Prior to any fieldwork we would like to meet you to discuss the possibility of doing our research with your child's team. At which point we will explain what is involved in the study, what participation would consist of, the benefits of the study, potential risks, proposed outcomes, and any other questions you

may have. We will also provide our contact information if you wish to contact us privately. It is our aims to make everyone involved feel as comfortable as possible and to take any measure we can to ensure such goals are met.

It is important to note that participation is voluntary and they can withdraw at anytime.

Furthermore, all participants of this research will be guaranteed complete anonymity and confidentiality and any information collected will not be shared directly with anyone else in the hockey organization. The findings for this research would be shared via public lectures and published documents including presenting the findings to Hockey Canada, the *Ottawa District Minor Hockey Association*, and l'Association de Hockey Mineur de Hull, to help reduce the prevalence and severity of injury in youth hockey. If you have any questions at any point, please contact the Office of Research Services, University of Ottawa

Sincerely,

International Ice Hockey Research Academy
University of Ottawa
Tel:
Fax:

Appendix E: Ethics Consent Forms

October 19, 2009

To Whom It May Concern,

Re: Comprehensive Injury Reporting and Impact on Participation Rates

Hockey Canada is supportive of the research initiative entitled "Comprehensive Injury Reporting and Impact on Participation Rates" proposed by of the University of Ottawa.

As the governing body for hockey in Canada, Hockey Canada is committed to growing the game and ensuring everyone involved enjoys their experience. Due to the physical nature of the sport, there is the potential risk of injury. It is important that Hockey Canada's membership have a source for accessing injury information that can serve a number of purposes including a clear understanding of the mechanisms of injury along with the overall the measurement of injuries rates.

This research initiative will assist Hockey Canada's membership to recognize the need for establishing injury databases. Should you have any additional questions or requests of Hockey Canada in support of research proposal, please do not hesitate to contact me at your convenience at

To whom it may concern,

The Association de Hockey Minor de Hull is aware of and supports the University of Ottawa youth hockey injury study entitled "**Comprehensive Injury Reporting and Impact on Participation Rates".** As partners in this research program, we expect to be informed of all research findings and to participate in all components of the study. We are confident that this research program will be valuable in providing minor hockey associations and Hockey Canada with information that will assist in reducing the risk of injury in youth hockey.

Sincerely,

To whom it may concern:

The Ottawa District Minor Hockey Association is aware of and supports the University of Ottawa youth hockey injury study entitled "**Comprehensive Injury Reporting and Impact on Participation Rates".** As partners in this research program, we expect to be informed of all research findings and to participate in all components of the study. We are confident that this research program will be valuable in providing minor hockey associations and Hockey Canada with information that will assist in reducing the risk of injury in youth hockey.

Thank-you for your time and consideration with regards to this joint effort. Please do not hesitate to contact the undersigned if questions arise.

To whom it may concern,

The Association de Hockey Minor de Hull is aware of and supports the University of Ottawa youth hockey injury study entitled **"Comprehensive Injury Reporting and Impact on Participation Rates".** As partners in this research program, we expect to be informed of all research findings and to participate in all components of the study. We are confident that this research program will be valuable in providing minor hockey associations and Hockey Canada with information that will assist in reducing the risk of injury in youth hockey.

To whom it may concern

The Ottawa District Minor Hockey Association is aware of and supports the University of Ottawa youth hockey injury study entitled "**Comprehensive Injury Reporting and Impact on Participation Rates**". As partners in this research program, we expect to be informed of all research findings and to participate in all components of the study. We are confident that this research program will be valuable in providing minor hockey associations and Hockey Canada with information that will assist in reducing the risk of injury in youth hockey.

Thank you for your time and consideration with regards to this joint effort. Please do not hesitate to contact the undersigned if questions arise.

INFORMED CONSENT

TITLE OF THE STUDY:

Comparative Study of Injury in Youth Competitive Hockey in Quebec and Ontario

INVESTIGATORS:

COMMUNITY PARTNERS:
Hockey Canada, Ottawa District Minor Hockey Association, Association du Hockey Mineur de Hull, Ottawa Girls Hockey Association.

PURPOSE OF THE RESEARCH

Document injury in youth ice-hockey bodychecking and non-bodychecking leagues in Ontario and Quebec. The research involves game observations to enumerate injuries as they occur in playing situations. In addition to quantifying the amount of injuries, this research will provide contextual details about injury situations to better understand how and why injuries are occurring.

PARTICIPATION IN THE STUDY

This study is primarily an observational study where researchers will observe and record on ice play of league hockey games. Participation in the study involves participating in an injury report

system to help monitor injury during the games. Injury reporting would consist of players self-reporting any injury incurred during games and answer a brief list of questions pertaining to the injury. Players who have not come forward but who were identified as being involved in an injurious situation may also be approached and be asked to answer questions pertaining to the situation observed during the game by researchers. The post-game injury assessment will take about 5 minutes.

It is important to note that video recordings of the games will be stored in locked filing cabinets in an office at the University of Ottawa for a period of 10 years. The recordings will only be accessible to the members of the research team. Recordings will be destroyed after 10 years.

BENEFITS

The primary benefit of this study is that at the conclusion of the study we will be presenting the findings to our hockey partners; Hockey Canada, Association du Hockey Mineur de Hull, Ottawa District Minor Hockey Association and the Ottawa Girls Hockey Association, to help reduce the prevalence and severity of injury in youth hockey.

CONFIDENTIALITY AND ANONYMITY

All participants will remain anonymous. Research participants will be categorized by a number with only Researchers and Research Assistants knowing what number corresponds to whom. All video documentation will be altered via digital editing software to avoid identification. If a participant withdraws the interview data will be destroyed immediately and will not be used.

VOLUNTARY PARTICIPATION

Participation in this study is entirely voluntary and participants can withdraw from the study at any time and/or refuse to answer any questions, without suffering any negative consequences.

RIGHTS OF THE PARTICIPANTS

The researchers guarantee that:

- Participants can withdraw from the project at any time.
- The confidentiality of the information gathered as well as the anonymity of all participants will be rigorously protected as indicated above.

COMMUNICATION OF RESULTS

At the conclusion of the study research results will be presented via a written plain language summary and oral presentation to the study partners, Hockey Canada, Association du Hockey Mineur de Hull, Ottawa District Minor Hockey Association and the Ottawa Girls Hockey Association.

Any information about your rights as a research participant may be addressed to the Protocol Officer for Ethics in Research, University of Ottawa .

There are two copies of the consent form, one of which you may keep.

If you have any questions about the conduct of the research project, you may contact toll free at 1-877-868-8292.

CONSENT:

I the undersigned, agree to participate in the above research study. The study has been explained to me, I have had the opportunity to ask questions about my child's involvement and to receive additional details that I wanted to know about the study. I understand that by accepting to participate, I am in no way waiving my right to withdraw from the study at any time.
I have been given a copy of this form.

Parent/Legal Guardian's signature: _____ Date: _____

Signature of Researcher: _____ Date: _____

FORMULAIRE DE CONSENTEMENT

TITRE DU PROJET:

Étude comparative sur les blessures dans le hockey de compétition pour les jeunes au Québec et en Ontario.

CHERCHEURS:

PARTENAIRES COMMUNAUTAIRES:

Hockey Canada, *Ottawa District Minor Hockey Association,* Association du hockey mineur de Hull, *Ottawa Girls Hockey Association.*

BUT DE LA RECHERCHE

Documenter les cas de blessures dans les ligues de hockey sur glace pour les jeunes avec et sans contact en Ontario et au Québec. Cette recherche implique des observations de parties de hockey de manière à recenser les blessures à mesure qu'elles se produisent en situations de jeu. En plus de quantifier le nombre de blessures, cette recherche fournira des détails contextuels sur les situations où les blessures se sont produites de manière à mieux comprendre comment et pourquoi les blessures surviennent.

PARTICIPATION À L'ÉTUDE

Cette étude est avant basée sur l'observation en ce que les chercheurs assisteront à des parties de ligues de hockey et enregistreront des données sur les situations de jeu. La participation à l'étude implique de contribuer à un système de déclaration des blessures qui vise à enregistrer des données sur les blessures survenues au cours de la partie. La déclaration de blessures se fait par

le biais des joueurs, qui rapportent eux-mêmes toute blessure survenue au cours d'une partie et répondent à quelques questions sur cette blessure. Les joueurs qui ont été identifiés comme impliqués dans une situation de blessure, mais qui ne l'ont pas rapporté, pourraient être approchés pour qu'ils répondent à des questions sur la situation observée par les chercheurs. Les entrevues de déclaration des blessures prendront environ 5 minutes à compléter.

Il est important de noter que des enregistrements vidéos des parties seront conservés dans des filières verrouillées dans le bureau du Professeur Robidoux à l'Université d'Ottawa pour une période de dix (10) ans. Les enregistrements seront seulement accessibles aux membres de l'équipe de recherche. Les enregistrements seront détruits au bout de cette période de dix ans.

AVANTAGES

L'avantage premier de cette étude est que, lorsqu'elle sera terminée, ses résultats seront présentés aux partenaires de l'étude, soit Hockey Canada, l'Ottawa *District Minor Hockey Association*, l'Association du hockey mineur de Hull et l'Ottawa *Girls Hockey Association,* le tout dans le but d'aider à réduire la prévalence et la sévérité des blessures dans le hockey pour les jeunes.

CONFIDENTIALITÉ ET ANONYMAT

L'anonymat est garanti pour tous les participants. Les participants seront identifiés par un numéro, les correspondances aux noms des participants étant connues des chercheurs et des assistants de recherche seulement. Toute la documentation vidéo sera altérée à l'aide d'un logiciel spécialisé afin d'éviter que les participants puissent être identifiés.

PARTICIPATION VOLONTAIRE

La participation à cette étude est entièrement volontaire et les participants peuvent soit se retirer de l'étude, soit refuser de répondre à toute question à tout moment et ce, sans possibilité de conséquences négatives.

DROITS DES PARTICIPANTS

Les chercheurs garantissent que:

- les participants peuvent se retirer de l'étude en tout temps;
- la confidentialité des informations recueillies et l'anonymat de tous les participants seront rigoureusement protégés et ce, de la manière indiquée plus haut.

COMMUNICATION DES RÉSULTATS

À la fin de l'étude, les résultats seront présentés sous la forme d'un sommaire en langage courant et d'une présentation orale aux partenaires de l'étude, soit Hockey Canada, l'*Ottawa District Minor Hockey Association*, l'Association du hockey mineur de Hull et l'*Ottawa Girls Hockey Association.*

Pour toute question concernant vos droits en tant que participant à cette recherche, veuillez contacter le Responsable de l'éthique en recherche de l'Université d'Ottawa.

Il existe deux copies du formulaire de consentement, dont une que vous pouvez conserver.

Pour toute question sur la conduite du projet de recherche, veuillez contacter le Professeur ou sans frais au 1-877-868-8292.

CONSENTEMENT

Je, soussigné, consens à participer au projet de recherche décrit plus haut. L'étude m'a été expliquée et j'ai eu l'occasion de poser des questions sur mon implication. J'ai également reçu de l'information sur tout détail supplémentaire que j'ai voulu connaître à propos de l'étude. Je comprends que le fait de consentir à participer à la présente étude ne me prive pas de mon droit de me retirer de l'étude en tout temps.

J'ai reçu une copie de ce formulaire.

Signature du parent/ gardien: _____ Date: _____

Signature du chercheur: _____ Date: _____

Note: L'utilisation du masculin sert uniquement à alléger le texte et désigne autant les hommes que les femmes.

YOUTH ASSENT FORM

Title: Comparative Study of Injury in Youth Competitive Hockey in Quebec and Ontario

This form may have some words that you do not know. Please ask the researcher to explain any words that you do not know.

What is this study about: To learn about how often injury occurs in boys' hockey and to understand why these injuries might be happening.

What happens to me if I choose to be in this study?

Our research team will watch and video tape your hockey games to see if any injuries have occurred. If you have received any type of injury, whether it was small or not, we ask that you report this to the team trainer. The trainer will ask you a few questions about the injury. If we think that an injury might have occurred, we would also ask the trainer to approach you to find out if you were injured or not.

What will happen with the information I give you?

When discussing or writing about this research, we will never use your name. The information you give us will not be shared with anyone outside of the training staff, your parents and us, the researchers.

What if I do not feel like participating in the study?

You do not have to participate and can refuse to answer any questions at any point of the study. You will not be penalized for not taking part in our study.

Questions?

If you have any questions about being in this study, you can call or have your parent(s) call:

Consent:

I have read this form and I understand the information about this study. I am willing to be in this study.

FORMULAIRE DE SANCTION

TITRE DU PROJET: Étude comparative sur les blessures dans le hockey compétitif pour les jeunes au Québec et en Ontario

Ce formulaire pourrait contenir certains termes que vous ne connaissez pas. Veuillez s'il vous plaît demander aux chercheurs de vous expliquer tous les termes que vous ne connaissez pas.

Sujet de l'étude:

Pour identifier la fréquence de blessures dans le hockey masculin et de comprendre pourquoi certaines blessures surviennent.

Qu'advient-il de moi si je choisis d'être dans cette étude?

Notre équipe de recherche va regarder et enregistrer vos parties de hockey avec des cassettes vidéo pour voir si des blessures ont eu lieu. Si vous avez eu une blessure, peu importe la nature ou le degré de sévérité, nous vous demandons de le signaler au préposé à la santé de l'équipe. Le préposé vous poser a quelques questions au sujet de la blessure. Si nous croyons que vous vous êtes blessé pendant une partie, nous allons demander au préposé de vous approcher pour voir si vous vous étés bel et bien blessé. Si c'est le cas, il vous posera plus de questions au sujet de la blessure.

Qu'allez-vous faire avec l'information que je vous donne?

En discutant ou en écrivant au sujet de cette recherche, nous n'utiliserons jamais votre nom. Les informations que vous allez nous donner ne seront pas partagés avec personne en dehors de la formation du personnel, de vos parents et nous, les chercheurs.

Que faire si je ne veux pas participer à l'étude?

Vous n'avez pas à participer et vous pouvez refuser de répondre aux questions à tout point de l'étude. Vous ne serez pas pénalisé pour ne pas prendre part à notre étude.

Questions?

Si vous avez des questions par rapport à votre participation à l'étude, vous ou votre parent/gardien pouvez communiquer avec une personne au l'universite

Consentement:

J'ai lu ce formulaire et je comprends les informations au sujet de l'étude. J'accepte de prendre part à cette étude.

Appendix F: Content Analysis

Player Code	Athletic Exposure	End Notes /Game	End Notes /Game	Date	League 0= BT (QC) 1= PW (ON yr2; 2011-12) 2= PW (ON yr1; 2009-10)	Game Type 0= Reg. Season 1= Playoff	Playing Position 0= Defense 1= Forward 2= Goalie	Team 0= BT/PW Opp 1=	Injury 0= No 1= Yes	Discomfort 0= No 1= Yes	Missed Time-Returned 0= No 1= Yes	Missed Time-No Return 0= No 1= Yes	Missed Subsequent Game 0= No 1= Yes	# of Games Missed	Head 0= No 1= Yes	Upper Body 0= No 1= Yes	Lower Body 0= No 1= Yes	Body Checking 0= No 1= Yes	Received Check 0= No 1= Yes	Giving Check 0= No 1= Yes	Into Boards 0= No 1= Yes	Stick 0= No 1= Yes	Stick: Deliberate Play 0= No 1= Yes	Stick: Inadvertent/ Incidental 0= No 1= Yes	Puck 0= No 1= Yes	Other 0= No 1= Yes	Shot Attempt at Net 0= No 1= Yes	Dump in/ Clearing Attempt/ Incidental 0= No 1= Yes	Altercation/ Battle 0= No 1= Yes	Incidental Collision 0= No 1= Yes	Penalty Called 0= No 1= Yes	Boarding (2min) 0=No 1=Yes
10	1	Game 1		02-Oct-11	0	0	1	0	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	1	1
#17 Papineau	2	Game 1		02-Oct-11	0	0	1	1	1	1	0	0	0	0	0	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
16	3	Game 1		02-Oct-11	0	0	1	0	1	0	1	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
10	31	Game 2		08-Oct-11	0	0	1	0	1	1	0	0	0	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
#27 Avalanches	32	Game 2		08-Oct-11	0	0	n/a	1	1	1	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
15	33	Game 2		08-Oct-11	0	0	1	0	1	1	0	0	0	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
10	59	Game 3		15-Oct-11	0	0	1	0	1	0	1	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1
16	60	Game 3		15-Oct-11	0	0	1	0	1	0	1	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
#10 Aylmer	61	Game 3		15-Oct-11	0	0	0	1	1	0	1	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0
#10 Aylmer	130	Game 5: Player misses remainde	)ct 22, 2011		0	0	0	1	1	0	1	1	n/a	n/a	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
#14 Aylmer	131	Game 5: no data available for m		22-Oct-11	0	0	0	1	1	0	0	1	n/a	n/a	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
13	145	Game 6		23-Oct-11	0	0	1	0	1	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	146	Game 6		23-Oct-11	0	0	1	0	1	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	172	Game 7		30-Oct-11	0	0	0	0	1	0	1	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
#9 Avalanches	173	Game 7		30-Oct-11	0	0	n/a	1	1	0	1	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
#5 Aylmer	202	Game 8		04-Nov-11	0	0	0	1	1	0	1	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0
10	203	Game 8		04-Nov-11	0	0	1	0	1	0	1	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
13	204	Game 8: 1st incident		04-Nov-11	0	0	1	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
#11 Aylmer	205	Game 8		04-Nov-11	0	0	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0
13	204	Game 8: 2nd incident		04-Nov-11	0	0	1	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
#17 Aylmer	258	Game 10		09-Nov-11	0	0	1	0	1	0	1	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
8	259	Game 10: one missed practice; r		09-Nov-11	0	0	1	0	1	0	0	1	0	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1
16	260	Game 10:		09-Nov-11	0	0	1	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0
8	372	Game 14: Missed a Period of pla		07-Dec-11	0	0	1	0	1	0	1	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	373	Game 14: Missed a Period of pla		07-Dec-11	0	0	1	0	1	0	1	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
#3 Papineau	374	Game 14		07-Dec-11	0	0	1	1	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
14	386	Game 14: Notes say he was injur		07-Dec-11	0	0	1	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
13	402	Game 15		22-Dec-11	0	0	1	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
15	432	Game 16: lost video footage; we		23-Dec-11	0	0	1	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0
38	463	Game 17: Missed 2 shifts that er		Jan-12	0	0	1	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
10	492	Game 18: First incident		07-Jan-12	0	0	1	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0
#99 Colline	493	Game 18		07-Jan-12	0	0	n/a	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0
10	492	Game 18: Second Incident		07-Jan-12	0	0	1	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0
10	519	Game 19		08-Jan-12	0	0	1	0	1	1	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
#19 Ambassadeurs	548	Game 20		12-Jan-12	0	0	0	1	1	0	0	1	n/a	n/a	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	549	Game 20		12-Jan-12	0	0	1	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0
#34 Colline	575	Game 21		13-Jan-12	0	0	n/a	1	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
#87 Avalanches	604	Game 22		15-Jan-12	0	0	1	1	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
5	605	Game 22		15-Jan-12	0	0	0	1	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1
8	606	Game 22		15-Jan-12	0	0	1	0	1	0	1	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
5	660	Game 24		28-Jan-12	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
16	661	Game 24: confirmed with origin		28-Jan-12	0	0	1	0	1	1	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
#99 Colline	662	Game 24		28-Jan-12	0	0	1	1	1	0	1	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
12	663	Game 24		28-Jan-12	0	0	1	0	1	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
#38 Colline	664	Game 24: we know he was TM-F		28-Jan-12	0	0	1	1	1	0	1	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
8	715	Playoff Game: 2; First Incident		15-Feb-12	0	1	1	0	1	0	1	0	1	2	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
8	715	Playoff Game: 2; Second Inciden		15-Feb-12	0	1	1	0	1	0	0	1	1	2	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
#35 Pap	741	Playoff Game: 3		23-Feb-12	0	1	2	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0
10	742	Playoff Game: 3		23-Feb-12	0	1	1	0	1	1	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0
#7 Pap	743	Playoff Game: 3		23-Feb-12	0	1	0	1	1	0	1	0	0	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	1	1	1
#16 Avs	772	Playoff Game: 4		25-Feb-12	0	1	n/a	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0
10	773	Playoff Game: 4		25-Feb-12	0	1	1	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0
#9 Avs	774	Playoff Game: 4		25-Feb-12	0	1	n/a	1	1	1	0	0	0	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
6	31	player punched in	2	12/12/2009	2	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
11	32	Check behind 0-zo	2	12/12/2009	2	0	1	0	1	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
n/a	33	#27-Rideau	2	12/12/2009	2	0	1	1	1	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
n/a	34	#96 Rideau	2	12/12/2009	2	0	n/a	1	1	1	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
n/a	35	#40 Rideau	2	12/12/2009	2	0	n/a	1	1	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	58	blocking shot from	3	20/12/2009	2	0	1	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
4	59	Attempted body c	3	20/12/2009	2	0	0	0	1	1	0	0	0	0	0	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
n/a	60	#3 Ottawa Valley 1	3	20/12/2009	2	0	0	1	1	0	1	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
n/a	61	#9 Ottawa Valley 1	3	20/12/2009	2	0	1	1	1	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
n/a	61	#9 Ottawa Valley 1	3	20/12/2009	2	0	1	1	1	1	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0

Player Code	Athletic Exposure	Hit to the Head (4min) 0=No 1=Yes	Hit to the Head (2min) 0=No 1=Yes	Slashing (2min) 0=No 1=Yes	Tripping (2min) 0=No 1=Yes	Hit From Behind (2min) 0=No 1=Yes	Hit From Behind (5min) 0=No 1=Yes	Roughing (2min) 0=No 1=Yes	Elbowing (2min) 0=No 1=Yes	High Stick (2min) 0=No 1=Yes	First Period 0= No 1= Yes	Second Period 0= No 1= Yes	Third Period 0= No 1= Yes	Mid/open Ice 0= No 1= Yes	Front of Net 0= No 1= Yes	Behind the Net 0= No 1= Yes	Corners 0= No 1= Yes	Along Boards 0= No 1= Yes	Player Height (cm)	Player Weight (kg)	BM	Weight Differential 0=Even 1=Negative 2=Positive	Level of Injury (discomfort) 0=No 1=Yes	Level of Injury (missed shift) 0=No 1=Yes	Level of Injury (period) 0=No 1=Yes	Level of Injury (rest of game) 0=No 1=Yes	Level of Injury (rest of game and more) 0=No 1=Yes	Injury Severity: 0= Finished Game 1= No Return	Location on ice zone = 0 N-zone = 1 D-zone = 2	Puck situation ARP= 0 PPP = 1 PB = 2
10	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	162.56	46.18	17.49	1	0	1	0	0	0	0	1	1
#17 Papineau	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	n/a	n/a	n/a	2	0	1	0	0	0	0	2	0
16	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	172.72	52.53	n/a	n/a	0	0	0	0	0	0	0	0
10	31	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	162.56	46.18	17.49	1	0	1	0	0	0	0	0	n/a
#27 Avalanches	32	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	n/a	n/a	n/a	2	0	1	0	0	0	0	0	0
15	33	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	167.64	52.8	18.79	1	0	1	0	0	0	0	1	1
10	59	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	162.56	46.18	17.49	1	0	0	1	0	0	0	1	1
16	60	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	172.72	52.53	17.63	2	0	1	0	0	0	0	1	n/a
#10 Aylmer	61	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	n/a	n/a	n/a	1	0	0	1	0	0	0	1	n/a
#10 Aylmer	130	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	n/a	n/a	n/a	1	0	0	0	1	0	1	0	n/a
#14 Aylmer	131	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	n/a	n/a	n/a	1	0	0	0	0	1	1	2	1
13	145	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	182.88	64.41	19.28	2	0	1	0	0	0	0	0	n/a
11	146	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	165.1	52.98	19.41	2	1	0	0	0	0	0	2	n/a
6	172	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	168.91	64.5	22.63	2	0	0	1	0	0	0	2	1
#9 Avalanches	173	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	n/a	n/a	n/a	1	0	0	1	0	0	0	1	0
#5 Aylmer	202	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	n/a	n/a	n/a	2	0	0	1	0	0	0	0	0
10	203	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	162.56	46.18	17.49	1	0	0	1	0	0	0	0	1
13	204	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	182.88	64.41	19.28	n/a	0	1	0	0	0	0	2	0
#11 Aylmer	205	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	n/a	n/a	n/a	0	1	0	0	0	0	0	0	n/a
13	204	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	182.88	64.41	19.28	n/a	0	1	0	0	0	0	2	n/a
#17 Aylmer	258	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	n/a	n/a	n/a	0	0	0	1	0	0	0	0	n/a
8	259	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	158.75	58.88	23.37	1	0	0	0	0	1	1	2	2
16	260	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	172.72	52.53	17.63	0	0	1	0	0	0	0	1	n/a
8	372	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	158.75	58.88	23.37	0	0	0	1	0	0	0	0	1
16	373	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	172.72	52.53	17.63	1	0	0	0	1	0	0	2	0
#3 Papineau	374	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	n/a	n/a	n/a	n/a	0	1	0	0	0	0	0	n/a
14	386	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	171.45	60.33	20.52	n/a	0	0	1	0	0	0	2	n/a
13	402	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	182.88	64.41	19.28	n/a	1	0	0	0	0	0	2	0
15	432	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	167.64	52.8	18.79	1	0	1	0	0	0	0	1	n/a
38	463	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	n/a	n/a	n/a	n/a	0	0	1	0	0	0	1	0
10	492	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	162.56	46.18	17.49	n/a	0	0	1	0	0	0	2	0
#99 Colline	493	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	n/a	n/a	n/a	2	0	1	0	0	0	0	2	2
10	492	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	162.56	46.18	17.49	n/a	0	1	0	0	0	0	2	0
10	519	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	162.56	46.18	17.49	1	0	1	0	0	0	0	0	2
#19 Ambassadeurs	548	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	n/a	n/a	n/a	0	0	0	0	1	0	1	2	n/a
15	549	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	167.64	52.8	17.49	n/a	0	1	0	0	0	0	2	0
#34 Colline	575	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	n/a	n/a	n/a	0	0	1	0	0	0	0	0	n/a
#87 Avalanches	604	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	n/a	n/a	n/a	0	0	1	0	0	0	0	0	n/a
5	605	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	175.26	57.43	18.71	0	0	1	0	0	0	0	2	1
8	606	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	158.75	58.88	23.37	1	0	1	0	0	0	0	0	n/a
5	660	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	175.26	57.43	18.71	0	0	1	0	0	0	0	2	1
16	661	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	172.72	52.53	17.63	0	0	1	0	0	0	0	1	n/a
#99 Colline	662	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	n/a	n/a	n/a	0	0	1	0	0	0	0	1	1
12	663	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	176.53	60.69	19.45	0	0	1	0	0	0	0	1	1
#38 Colline	664	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	n/a	n/a	n/a	0	0	0	1	0	0	0	0	0
8	715	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	158.75	58.88	23.37	0	0	1	0	0	0	0	0	n/a
8	715	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	158.75	58.88	23.37	1	0	0	1	0	0	1	0	0
#35 Pap	741	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	n/a	n/a	n/a	0	0	0	1	0	0	0	2	0
10	742	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	162.56	46.18	17.49	0	0	0	1	0	0	0	2	0
#7 Pap	743	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	n/a	n/a	n/a	0	0	0	1	0	0	0	2	1
#16 Avs	772	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	n/a	n/a	n/a	n/a	0	1	0	0	0	0	0	n/a
10	773	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	162.56	46.18	17.49	1	1	0	0	0	0	0	0	n/a
#9 Avs	774	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	n/a	n/a	n/a	0	1	0	0	0	0	0	2	2
6	31	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	149.86	41.73	18.63	0.00	0.00	0.00	1.00	0.00	0.00	0	1	n/a
11	32	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	140.97	34.93	17.55	1.00	1.00	0.00	0.00	0.00	0.00	0	0	n/a
n/a	33	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	n/a	n/a	n/a	1	0	1	0	0	0	0	1	1
n/a	34	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	n/a	n/a	n/a	2	1	0	0	0	0	0	0	0
n/a	35	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	n/a	n/a	n/a	0	1	0	0	0	0	0	1	1
3	58	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	140.97	33.57	16.87	n/a	0.00	1.00	0.00	0.00	0.00	0	2	n/a
4	59	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	160.02	57.61	22.50	2.00	0.00	1.00	0.00	0.00	0.00	0	1	0
n/a	60	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	n/a	n/a	n/a	0	0	1	0	0	0	0	1	n/a
n/a	61	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	n/a	n/a	n/a	0	1	0	0	0	0	0	1	0
n/a	61	0	0	0	0	0	0	0	0	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	?	?	?	?	?	?	?	0	?	?

Player Code	Athletic Exposure	Hit by puck BS = 0 clearing =1 dump in =2	Action with puck stickhandle = 0 reception = 1 2	puck passing = shooting = 3	Confrontation After whistle = 0 During game = 1	Battle for Puck off = 0 net = 1	face-front of against boards =2	Attentional Focus = 0 on opponent = 2	head down incoming puck = 1 where puck is aimed =3	Principal point of contact head/neck = 0	upper lower = 2 back/spine = 3	Aggression retaliatory action = 0 retaliatory action = 1	non-	Body-check type contact = 0 contact = 1 behind = 2	side front hit from hip check = 3
10	1	n/a	n/a	n/a	n/a	n/a			0	3		1			2
#17 Papineau	2	n/a	n/a	n/a	n/a	n/a			2	1		1	n/a		
16	3	n/a	n/a	n/a	n/a	n/a			2	1		1			1
10	31	n/a		3	n/a	n/a			0	1		1			0
#27 Avalanches	32	n/a	n/a		1	n/a			2	2		0	n/a		
15	33	n/a		1	n/a	n/a			1	1		1			0
10	59	n/a		3	n/a	n/a			3	1	n/a				0
16	60	n/a		0	n/a	n/a			0	0	n/a				1
#10 Aylmer	61	n/a	n/a	n/a	n/a	n/a			2	3		1			2
#10 Aylmer	130	n/a		0	n/a	n/a			2	1		1			1
#14 Aylmer	131	n/a		1	n/a		2		1	1		1			1
13	145	n/a	0	n/a		n/a			2	1		1			0
11	146	n/a	3	1		0			0	3		1			2
6	172	n/a	1	n/a		n/a			2	1		1			0
#9 Avalanches	173	n/a	n/a			n/a			2	1		1			1
#5 Aylmer	202	n/a	n/a	n/a		n/a			1	0		1			n/a
10	203	n/a	1	n/a		2			1	3		1			0
13	204	2	n/a	n/a		n/a			2	1		1			n/a
#11 Aylmer	205	n/a	0	n/a		n/a			3	2		1			n/a
13	204	1	n/a	n/a		n/a			1	2		1			n/a
#17 Aylmer	258	n/a	3	n/a		n/a			3	0		1			0
8	259	n/a	1	n/a		2			0	3		1			2
16	260	n/a	0	n/a		n/a			0	2		1			n/a
8	372	n/a	n/a	n/a		2			1	1		1			0
16	373	n/a	n/a	n/a		n/a			2	0		1			0
#3 Papineau	374	0	n/a	n/a		0			2	2		1	n/a		
14	386	0	n/a	n/a	n/a				2	2		1	n/a		
13	402	0	n/a	n/a		n/a			2	1		1			n/a
15	432	n/a	0	n/a		n/a			3	2		1			n/a
38	463	1	n/a	n/a		n/a			2	1		1			n/a
10	492	0	n/a	n/a		n/a			2	1		1			n/a
#99 Colline	493	n/a	n/a	1		2			0	2		1			n/a
10	492	0	n/a	n/a		n/a			2	1		1			n/a
10	519	n/a	0	1	n/a				0	2		1			n/a
#19 Ambassadeurs	548	n/a	0	n/a		n/a			0	0		1			1
15	549	0	n/a	n/a		n/a			2	1		1			n/a
#34 Colline	575	n/a	2	n/a		n/a			3	1		1			0
#87 Avalanches	604	n/a	3	1		1			0	1		1			2
5	605	n/a	n/a	n/a		2			2	3		1			2
8	606	n/a	n/a	1		1			1	1		0			n/a
5	660	n/a	2	n/a		2			0	3		1			2
16	661	n/a	0	n/a		n/a			0	3		1			2
#99 Colline	662	n/a	n/a	1	n/a				1	0		1			1
12	663	n/a	n/a	1	n/a				1	2		1			0
#38 Colline	664	n/a	1	n/a		2			1	1		1			0
8	715	n/a	3	n/a	n/a				3	2		1	n/a		
8	715	n/a	n/a	n/a	n/a				2	1		1			0
#35 Pap	741	n/a	n/a	1		1			1	0		1	n/a		
10	742	n/a	n/a	n/a		n/a			2	2		1	n/a		
#7 Pap	743	n/a	n/a	n/a		2			1	3		1			2
#16 Avs	772	0	n/a	n/a		1			1	1		1	n/a		
10	773	0	n/a	1		1			2	3		1			2
#9 Avs	774	n/a	n/a	1		2			0	3		1			2
6	31	n/a	n/a	1	n/a				2	0		1	n/a		
11	32	n/a	0	n/a	n/a				2	2		1			3
n/a	33	n/a	3	n/a	n/a				2	1		1			1
n/a	34	n/a	n/a	n/a		n/a			2	2		1			0
n/a	35	n/a	n/a	1		2			2	1		1			0
3	58	0	n/a	n/a		n/a			2	2		1			n/a
4	59	n/a	n/a	n/a		n/a			2	1		1			1
n/a	60	n/a	3	n/a		n/a			3	1		1			0
n/a	61	n/a	n/a	n/a		n/a			2	1		1			0
n/a	61	?	?	?		?	?		?	?		?			

Player Code	Athletic Exposure		Injury explaination
10		1	chasing puck hit from behind with his head down into the redline boards, small and unstable player hit by much bigger player
#17 Papineau		2	on a back-check player tries to finish hit, OLY turns away and player goes head and shoulder first into the boards, b-line in d-zone
16		3	Behind opp net, tries to finish check and is checked by opp, stays down and then heads for the bench
10		31	attempts shot at opp b-line, gets hit as his follows through, clean, but in the danger area of the boards and slides head first into the boards, complained of sore neck
#27 Avalanches		32	after attempting a check that fails, OLY gives a revenge slash behind the play to the back of the calf
15		33	chasing a buddy pass in the n-zone, gets hit into the boards, hands of opp got up and hit him in the head, head hit the boards, clutches his hea
10		59	dumps the puck in at the red line and watches puck. Hit by opp cleanly except OLY was in the danger zone by the boards, fell awkwardly
16		60	caught with head down going over opp b-line, hands got up into the face of OLY
#10 Aylmer		61	Player tried to run interference on OLY to protect his teammate but was pushed in the danger area and went head first into the boards in n-zone, left ice on his own but fell once on the way, missed 5.5 minute
#10 Aylmer		130	tried to squeeze past OLY d-man going over b-line and was hip checked into the boards, went off and played a few shifts but then left the gam
#14 Aylmer		131	Puck came around boards on a breakout, player was hit by forechecker and jammed his hand I believe. Contact with player and boards, dropped glove and went to bench, left before handshake and was seen crying in hallway. Left immediately for the hospital for what the trainer believed was a broken wrist
13		145	skated across o-zone b-line and checked close to the boards, from the side
11		146	collision after the face-off with puck between his feet and head down
6		172	d-man partner sent blind pass behind own net, player tried to clear it along the boards and received check in own zone into the boards, needed to come out and have a practice skate and then returned later. (knee or foot awkward injury
#9 Avalanches		173	stood up at b-line by Dman while trying to deliver a hit went back to bench and collapsed, missed a few shifts
#5 Aylmer		202	tried to keep puck in on a pinch along the boards, opp stick came up on follow through and hit him in the neck
10		203	check behind the net into the boards chasing puck
13		204	took a clearing attempt to the high chest/neck area
#11 Aylmer		205	slashed to the ankle on partial breakaway, looked hurt and furious and fell into the goalie
13		204	hit in the side of the thigh by clearing attempt from own team (slapshot), went down and took a while to get up and off the ice
#17 Aylmer		258	hit hard into the boards in o-zone PK after releasing a shot, gets up slowly and heads to bench. Sits alone at end of bench with trainer working on him. Holding his head possible concussion????
8		259	hit from behind in d-zone, puck between his feet and along the boards. Possible concussion or spnial, ambulance was called and blankets were brought out to keep player warm until paramedics arrived.
16		260	skating up the ice and got feet tangled with opp and he was checked. Slew foot
8		372	risky play, hit hard and went straight to the bench, teammates asking if he is alright. Hit behind opp net with full head of steam by d-man chasing puck
16		373	chasing d-man of opp at b-line. After shot is taken he tries to line him up and is stood up by a much taller and larger player. Receives elbow due to other players size to the head but was not intentional
#3 Papineau		374	stung by own team shot to the ankle, top of crease
14		386	blocked shot off the leg in d-zone
13		402	block shot in d-zone on a PK. Hand injury, takes off glove on the bench
15		432	gets tripped and gets up gingerly and goes to the bench for comfort
38		463	on PP hit by clearing attempt in the n-zone (shoulder/arm)
10		492	blocked shot to the mid section in d-zone and needed comforting on the bench
#99 Colline		493	in d-zone gets tangled up with 2 OLY players and trips falling backwards on a stick, tailbone I imagine
10		492	blocked shot on PK in d-zone with hand. Left ice right away and saw trainer.
10		519	battle for puck in the o-zone and the player gets speared in the groin (appears intentional)
#19 Ambassadeurs		548	picking up puck from a dump in behind the net with head down and D man from OLY comes all the way up the ice to lay out a huge check. 19OPP was checked after the game for a concussion
15		549	blocked a shot off the wrist in the d-zone
#34 Colline		575	hit into the boards behind the net in o-zone after chasing down a puck to then center in front of the net
#87 Avalanches		604	gets pushed while going to the net and crashes hard into the boards, receives comforting on the bench
5		605	chasing down a dumped in puck the d-man gets hit from behind into the boards, teammate came to his defens
8		606	player was butt-ended to the ribs at the top of the crease in the o-zone in a battle
5		660	(PK) hit into end boards behind the net, on a dump in, back turned to checker, needed comforting
16		661	pushed from behind in the n-zone into a oncoming opp, received a hit to the head and went off immediately, father went to check him out and said he was okay.
#99 Colline		662	oppsing players chase after a puck and collide, receives a high stick and goes off gingerly after a collision and receives comforting
12		663	gets clipped by opp and falls, ends up stretching his leg on the bench
#38 Colline		664	clean hit into the boards in o-zone and must have tweaked his knee or ankle, seen holding his leg on the bench
8		715	On partial breakaway and opp dives and takes out his feet, goes head first after his shot into the boards bracing himself with his arms (wrist injury)
8		715	(PP) tried to stick check someone and got wrist jammed in their body
#35 Pap		741	received a hit to the head during a net scramble, held his head for a moment. Defenceman pushed a OLY forward on top of the goalie
10		742	without the puck the OLY player skates across the ice in the d-zone and was tripped and got up gingerly
#7 Pap		743	risky hit in d-zone. Defenceman goes back to get a dump in and is hit from behind into the boards. Clutches his head as he goes to the bench.
#16 Avs		772	hit by puck from own teammates slapshot, upper body and in front of the crease
10		773	goes to the front of the net to screen the goalie and is cross-checked from behind by d-man, while falling he is hit in the head by own teammates shot
#9 Avs		774	while battling in d-zone with OLY, opp was hit from behind and was not suspecting the check. Fell awkwardly into the boards in d-zone and stayed down, he rejoined the actio
6		31	retaliatory punch to the head, in the neutral zone
11		32	Team attempts to cycle puck in ozone, player recieves a hip check in the o-zone and goes directly off.
n/a		33	d-man steps up along n-zone boards to make a play and is crushed into the boards and knew it was coming but couldn't evade
n/a		34	tried to hit CBL along o-zone boards and goes off limping
n/a		35	hit in the n-zone chasing a puck, hit hard into the boards. He tried to make contact before the puck was played but was knocked down and fell awkwardly into the boards
3		58	not facing the puck but trying to cover his man, CBL is hit in the back upper thigh or buttocks by slapshot and hobbles off the ice
4		59	attempts to angle opp into boards while skating backwards and deliver hit but missed and went chest first into the boards, awkward fal
n/a		60	had to gain red line to dump it in and was left vulnerable to a hit against the boards in the n-zone
n/a		61	tried to deliver a hit and hurt his elbow at own b-line in open ice
n/a		61	?

Player Code	Athletic Exposure	End Notes /Game	End Notes /Game	Date	League 0= BT (QC) 1= PW (ON yr2; 2011-12) 2= PW (ON yr1; 2009-10)	Game Type 0= Reg. Season 1= Playoff	Playing Position 0= Defense 1= Forward 2= Goalie	Team 0= BT/PW 1= Opp	Injury 0= No 1= Yes	Discomfort 0= No 1= Yes	Missed Time-Returned 0= No 1= Yes	Missed Time-No Return 0= No 1= Yes	Missed Subsequent Game 0= No 1= Yes	# of Games Missed	Head 0= No 1= Yes	Upper Body 0= No 1= Yes	Lower Body 0= No 1= Yes	Body Checking 0= No 1= Yes	Received Check 0= No 1= Yes	Giving Check 0= No 1= Yes	Into Boards 0= No 1= Yes	Stick 0= No 1= Yes	Stick: Deliberate Play 0= No 1= Yes	Stick: Inadvertent/ Incidental 0= No 1= Yes	Puck 0= No 1= Yes	Other 0= No 1= Yes	Shot Attempt at Net 0= No 1= Yes	Dump in/ Clearing Attempt/ Incidental 0= No 1= Yes	Altercation/ Battle 0= No 1= Yes	Incidental Collision 0= No 1= Yes	Penalty Called 0= No 1= Yes	Boarding (2min) 0=No 1=Yes
1	87	blocking shot from	4	10/01/2010	2	0	1	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
n/a	88	#5 Nepean	4	10/01/2010	2	0	n/a	1	1	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0
n/a	89	#19 Nepean: First	4	10/01/2010	2	0	n/a	1	1	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
n/a	89	#19 Nepean: Seco	4	10/01/2010	2	0	n/a	1	1	0	1	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
4	117	16 games missed	5	11/01/2010	2	0	0	0	1	0	0	1	1	16	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0
6	118	Body checked into	5	11/01/2010	2	0	0	0	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
n/a	147	#5 Nepean	6	20/01/2010	2	0	n/a	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
n/a	148	#8 Nepean	6	20/01/2010	2	0	n/a	1	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
n/a	176	#17 Ottawa Sting-	7	23/01/2010	2	0	n/a	1	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	1	0
n/a	204	#21 Kanata-hit fro	8	24/01/2010	2	0	n/a	1	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	1	0
3	233	Hit from Behind-B	9	26/01/2010	2	0	1	0	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	1	0
3	233	TMJ/neck, jaw	9	26/01/2010	2	0	1	0	1	0	1	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
n/a	234	#2 Rideau	9	26/01/2010	2	0	n/a	1	1	0	0	1	n/a	n/a	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
n/a	235	#7 Rideau-blocking	9	26/01/2010	2	0	n/a	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
11	260	hit from dump in	10	30/01/2010	2	0	1	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0
n/a	261	#16 Kanata-hit fro	10	30/01/2010	2	0	n/a	1	1	1	0	0	0	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	1	0	0
7	288	Hit along boards	11	06/02/2010	2	0	1	0	1	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
3	289	recurrence from p	11	06/02/2010	2	0	1	0	1	1	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0
n/a	290	#28 Seaway	11	06/02/2010	2	0	n/a	1	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
n/a	291	#2 Seaway	11	06/02/2010	2	0	n/a	1	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
1	346	elbow to head	13	13/02/2010	2	0	1	0	1	1	0	0	0	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	1	0	0
6	376	hit by player clear	14	15/02/2010	2	1	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0
n/a	377	#24 Seaway	14	15/02/2010	2	1	n/a	1	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
16	378	over stretched try	14	15/02/2010	2	1	2	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
5	406	trainer had ice pac	15	18/02/2010	2	1	1	0	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
5	406	whiplash, headach	15	18/02/2010	2	1	1	0	1	0	0	1	1	2	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
13	407	Opponet body che	15	18/02/2010	2	1	1	0	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
n/a	408	#24 Seaway	15	18/02/2010	2	1	n/a	1	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
n/a	409	#8 Seaway	15	18/02/2010	2	1	n/a	1	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
3	434	hit from behind	16	20/02/2010	2	1	1	0	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	1	0	0
3	434	5min hitting from	16	20/02/2010	2	1	1	0	1	0	1	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	1	0	0
12	435	Face to face hit in	16	20/02/2010	2	1	1	0	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
9	462	Hit after passing p	17	23/02/2010	2	1	0	0	1	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0
n/a	463	#28 Seaway	17	23/02/2010	2	1	n/a	1	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
11	492	late hit; sprain left	18	27/02/2010	2	1	1	0	1	0	0	1	1	2	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
5	493	contusion, lateral	18	27/02/2010	2	1	1	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
1	494	Hit after passing p	18	27/02/2010	2	1	1	0	1	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
12	495	hit to head penalty	18	27/02/2010	2	1	1	0	1	1	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0
3	496	High stick to neck	18	27/02/2010	2	1	1	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0
n/a	497	#10 Gloucester	18	27/02/2010	2	1	n/a	1	1	1	0	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
n/a	498	#4 Gloucester-high	18	27/02/2010	2	1	n/a	1	1	1	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0
1	523	strain neck, whipla	19	28/02/2010	2	1	1	0	1	0	1	0	0	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
12	524	Hit in head initiati	19	28/02/2010	2	1	1	0	1	1	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
n/a	525	#26 Gloucester	19	28/02/2010	2	1	n/a	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
10	553	n/a	20	03/03/2010	2	1	1	0	1	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
13	554	n/a	20	03/03/2010	2	1	1	0	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
n/a	555	#4 Gloucester	20	03/03/2010	2	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
3	584	blocked shot	21	06/03/2010	2	1	1	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
n/a	585	#20 Gloucester	21	06/03/2010	2	1	n/a	1	1	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
n/a	615	#7 Ottawa Valley-I	22	11/03/2010	2	1	n/a	1	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0
2	673	contusion, left floa	24	25/03/2010	2	1	0	0	1	0	1	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
6	674	broke wrist missed	24	25/03/2010	2	1	0	0	1	0	0	1	1	2	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
3	675	n/a	24	25/03/2010	2	1	1	0	1	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
12	703	hit from behind	25	27/03/2010	2	1	1	0	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0
5	704	n/a	25	27/03/2010	2	1	1	0	1	0	1	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
n/a	705	#6 Ottawa Valley	25	27/03/2010	2	1	n/a	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0
N/A	54	2	#94 of Kings-A	03-Oct-11	1	0	1	1	1	0	1	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
N/A	55	2	# 18 of Kings-	03-Oct-11	1	0	1	1	1	0	1	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
21	66	3	G6 in discomf	15-Oct-11	1	0	1	0	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	1	0	0	0
N/A	86	3	#14 Aces carn	15-Oct-11	1	0	1	1	1	0	1	0	0	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
N/A	111	4	#4 Blazers Cul	19-Oct-11	1	0	0	1	1	0	1	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A	117	4	#18 Blazers ge	19-Oct-11	1	0	1	1	1	0	1	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
30	136	5	G20 tried to h	22-Oct-11	1	0	1	0	1	0	1	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0

Player Code	Athletic Exposure	Hit to the Head (4min) 0=No 1=Yes	Hit to the Head (2min) 0=No 1=Yes	Slashing (2min) 0=No 1=Yes	Tripping (2min) 0=No 1=Yes	Hit From Behind (2min) 0=No 1=Yes	Hit From Behind (5min) 0=No 1=Yes	Roughing (2min) 0=No 1=Yes	Elbowing (2min) 0=No 1=Yes	High Stick (2min) 0=No 1=Yes	First Period 0= No 1= Yes	Second Period 0= No 1= Yes	Third Period 0= No 1= Yes	Mid/open Ice 0= No 1= Yes	Front of Net 0= No 1= Yes	Behind the Net 0= No 1= Yes	Corners 0= No 1= Yes	Along Boards 0= No 1= Yes	Player Height (cm)	Player Weight (kg)	BM	Weight Differential 0=Even 1=Negative 2=Positive	Level of Injury (discomfort) 0=No 1=Yes	Level of Injury (missed shift) 0=No 1=Yes	Level of Injury (period) 0=No 1=Yes	Level of Injury (rest of game) 0=No 1=Yes	Level of Injury (rest of game and more) 0=No 1=Yes	Injury Severity: 0= Finished Game 1= No Return	Location on ice zone = 0 N-zone = 1 D-zone = 2	O-	Puck situation ARP= 0 PPP = 1 PB = 2	
1	87	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	133.35	31.75	17.84	n/a	0.00	0.00	1.00	0.00	0.00	0	2	n/a		
n/a	88	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	n/a	n/a	n/a	0	1	0	0	0	0	0	1		1	
n/a	89	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	n/a	n/a	n/a	1	1	0	0	0	0	0	0		1	
n/a	89	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	n/a	n/a	n/a	0	0	1	0	0	0	0	0	n/a		
4	117	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	160.02	57.61	22.50	2.00	0.00	0.00	0.00	0.00	1.00	1	1		0	
6	118	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	149.86	41.73	18.63	0.00	0.00	1.00	0.00	0.00	0.00	0	2		1	
n/a	147	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	n/a	n/a	n/a	n/a	1	0	0	0	0	0	2		0	
n/a	148	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	n/a	n/a	n/a	2	1	0	0	0	0	0	2	n/a		
n/a	176	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	n/a	n/a	n/a	1	0	1	0	0	0	0	2		1	
n/a	204	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	n/a	n/a	n/a	0	1	0	0	0	0	0	1		1	
3	233	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	140.97	33.57	16.87	1.00	1.00	0.00	0.00	0.00	0.00	0	0		2	
3	233	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	140.97	33.57	16.87	1.00	0.00	0.00	1.00	0.00	0.00	0	0		2	
n/a	234	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	n/a	n/a	n/a	0	0	0	0	1	0	1	2		2	
n/a	235	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	n/a	n/a	n/a	1	1	0	0	0	0	0	2		0	
11	260	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	140.97	34.93	17.55	n/a	1.00	0.00	0.00	0.00	0.00	0	1		0	
n/a	261	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	n/a	n/a	n/a	0	1	0	0	0	0	0	0		1	
7	288	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	140.97	51.71	25.98	2.00	1.00	0.00	0.00	0.00	0.00	0	1		2	
3	289	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	140.97	33.57	16.87	1.00	0.00	1.00	0.00	0.00	0.00	0	1	n/a		
n/a	290	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	n/a	n/a	n/a	1	1	0	0	0	0	0	2		1	
n/a	291	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	n/a	n/a	n/a	1	1	0	0	0	0	0	2		1	
1	346	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	133.35	31.75	17.84	1.00	1.00	0.00	0.00	0.00	0.00	0	0		1	
6	376	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	149.86	41.73	18.63	n/a	0.00	1.00	0.00	0.00	0.00	0	0		0	
n/a	377	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	n/a	n/a	n/a	0	1	0	0	0	0	0	1	n/a		
16	378	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	153.67	n/a	n/a	2	0	1	0	0	0	0	2	n/a		
5	406	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	153.67	43.54	18.45	1.00	0.00	0.00	1.00	0.00	0.00	0	2		1	
5	406	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	153.67	43.54	18.45	1.00	0.00	0.00	0.00	0.00	1.00	1	1		2	
13	407	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	156.21	38.56	15.80	1.00	0.00	1.00	0.00	0.00	0.00	0	0		1	
n/a	408	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	n/a	n/a	n/a	1	0	1	0	0	0	0	1	n/a		
n/a	409	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	n/a	n/a	n/a	0	1	0	0	0	0	0	0	?		?
3	434	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	140.97	33.57	16.87	1.00	1.00	0.00	0.00	0.00	0.00	0	0		2	
3	434	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	140.97	33.57	16.87	1.00	0.00	1.00	0.00	0.00	0.00	0	0		2	
12	435	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	140.97	35.38	17.78	0.00	0.00	1.00	0.00	0.00	0.00	0	0		1	
9	462	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	157.48	41.73	16.71	1.00	0.00	1.00	0.00	0.00	0.00	0	1	n/a		
n/a	463	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	n/a	n/a	n/a	0	1	0	0	0	0	0	2		1	
11	492	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	140.97	34.93	17.55	1.00	0.00	0.00	0.00	0.00	1.00	1	1		2	
5	493	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	153.67	43.54	18.45	n/a	0.00	0.00	0.00	1.00	0.00	1	2		0	
1	494	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	133.35	31.75	17.84	0.00	1.00	0.00	0.00	0.00	0.00	0	1	n/a		
12	495	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	140.97	35.38	17.78	1.00	1.00	0.00	0.00	0.00	0.00	0	1		0	
3	496	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	140.97	33.57	16.87	1.00	1.00	0.00	0.00	0.00	0.00	0	0		2	
n/a	497	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	n/a	n/a	n/a	1	1	0	0	0	0	0	0		1	
n/a	498	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	n/a	n/a	n/a	0	1	0	0	0	0	0	0		2	
1	523	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	133.35	31.75	17.84	1.00	0.00	0.00	1.00	0.00	0.00	0	1		1	
12	524	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	140.97	35.38	17.78	0.00	1.00	0.00	0.00	0.00	0.00	0	1	n/a		
n/a	525	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	n/a	n/a	n/a	0	1	0	0	0	0	0	1	n/a		
10	553	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	161.29	68.04	26.17	2.00	1.00	0.00	0.00	0.00	0.00	0	1	n/a		
13	554	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	156.21	38.56	15.80	1.00	1.00	0.00	0.00	0.00	0.00	0	2		2	
n/a	555	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	n/a	n/a	n/a	1	1	0	0	0	0	0	0	n/a		
3	584	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	140.97	33.57	16.87	n/a	1.00	0.00	0.00	0.00	0.00	0	2		0	
n/a	585	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	n/a	n/a	n/a	0	1	0	0	0	0	0	0	?		?
n/a	615	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	n/a	n/a	n/a	1	1	0	0	0	0	0	0	?		?
2	673	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	156.21	38.56	15.80	1.00	0.00	1.00	0.00	0.00	0.00	0	2	n/a		
6	674	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	149.86	41.73	18.63	1.00	0.00	0.00	0.00	0.00	1.00	1	2		2	
3	675	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	140.97	33.57	16.87	0.00	1.00	0.00	0.00	0.00	0.00	0	1	n/a		
12	703	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	140.97	35.38	17.78	1.00	1.00	0.00	0.00	0.00	0.00	0	1	n/a		
5	704	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	153.67	43.54	18.45	0.00	0.00	0.00	1.00	0.00	0.00	0	1	n/a		
n/a	705	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	n/a	n/a	n/a	0	1	0	0	0	0	0	0	?		?
N/A	54	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	N/A	N/A	n/a	0	0	1	0	0	0	0	1		0	
N/A	55	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	N/A	N/A	n/a	1	1	0	0	0	0	0	0		1	
21	66	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	152.4	47.67	20.55	0	0	1	0	0	0	0	0		2	
N/A	86	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	N/A	N/A	n/a	1	0	1	0	0	0	0	2		1	
N/A	111	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	N/A	N/A	n/a	0	0	1	0	0	0	0	2	n/a		
N/A	117	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	N/A	N/A	n/a	1	0	1	0	0	0	0	1	n/a		
30	136	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	143	38.59	18.92	1	0	1	0	0	0	0	1		0	

Player Code	Athletic Exposure	Hit by puck BS = 0 clearing =1 dump in =2	Action with puck stickhandle = 0 reception = 1 2	puck passing = shooting = 3	Confrontation After whistle = 0 During game = 1	Battle for Puck off = 0 net = 1	face-front of against boards =2	Attentional Focus = 0 on opponent = 2	head down incoming puck = 1 where puck is aimed =3	Principal point of contact head/neck = 0	upper lower = 2 back/spine = 3	Aggression retaliatory action = 0	non-retaliatory action = 1	Body-check type contact = 0	contact = 1 behind = 2	side front hit from hip check = 3
1	87	0		n/a	n/a		n/a		2		2		1			n/a
n/a	88	n/a		n/a	n/a		2		1		1		1			0
n/a	89	n/a		n/a	n/a		2		1		1		1			0
n/a	89	n/a		0	n/a		n/a		3		1		1			0
4	117	n/a		n/a	n/a		n/a		2		2		1			3
6	118	n/a		1	n/a		2		0		3		1			2
n/a	147	0		n/a	n/a		n/a		2		1		1	n/a		
n/a	148	n/a		n/a	1		1		2		1		1	n/a		
n/a	176	n/a		1	n/a		2		0		3		1			2
n/a	204	n/a		n/a	n/a		2		0		3		1			2
3	233	n/a		n/a	n/a		2		0		3		1			2
3	233	n/a		0	n/a		n/a		0		0		1			1
n/a	234	n/a		n/a	n/a		1		2		1		1			1
n/a	235	0		n/a	n/a		n/a		2		1		1			0
11	260	2		n/a	n/a	n/a			2		2		1	n/a		
n/a	261	n/a		n/a	n/a		2		0		3		1			2
7	288	n/a		0	n/a		2		0		2		1			0
3	289	n/a		0	n/a	n/a			0		0		1			1
n/a	290	n/a		n/a	n/a	n/a			1		1		1			0
n/a	291	n/a		n/a	n/a		n/a		1		1		1			0
1	346	n/a		n/a	n/a		2		2		0		1			0
6	376	1		n/a	n/a	n/a			2		1		1	n/a		
n/a	377	n/a		0	n/a	n/a			0		1		1			1
16	378	0		n/a	n/a	n/a			1		2		1	n/a		
5	406	n/a		n/a	n/a		2		1		3		1			2
5	406	n/a		1	n/a		2		1		1		1			0
13	407	n/a		1	n/a		2		0		1		1			0
n/a	408	n/a		2	n/a	n/a			3		1		1			0
n/a	409	?	?		?	?		?		?		?		?		
3	434	n/a		0	n/a		2		0		3		1			2
3	434	n/a		0	n/a		2		0		3		1			2
12	435	n/a	n/a		n/a	n/a			1		1		1			0
9	462	n/a		0	n/a	n/a			2		1		1			1
n/a	463	n/a	n/a		n/a		2		1		1		1			0
11	492	n/a		0	n/a		2		0		1		1			0
5	493	0	n/a		n/a	n/a			2		2		1	n/a		
1	494	n/a		0	n/a	n/a			0		1		1			1
12	495	n/a	n/a		1		2		0		0		1			1
3	496	n/a	n/a		1		1		2		0		1	n/a		
n/a	497	1		1	n/a	n/a			1		1		1			0
n/a	498	n/a	n/a		1		1		2		0		1	n/a		
1	523	n/a	n/a	n/a		n/a			1		1		1			0
12	524	n/a		0	n/a	n/a			2		0		1			1
n/a	525	n/a		0	n/a	n/a			3		2		0	n/a		
10	553	n/a		0	n/a	n/a			0		1		1			1
13	554	n/a	n/a	n/a			2		0		1		1			0
n/a	555	0	n/a	n/a		n/a			2		1		1	n/a		
3	584	0	n/a	n/a		n/a			2		1		1	n/a		
n/a	585	?	?	?		?	?		?		?		?			
n/a	615	?	?	?		?	?		?		?		?			
2	673	n/a		0	n/a	n/a			2		1		1			0
6	674	n/a	n/a	n/a			1		0		1		1			1
3	675	n/a		0	n/a	n/a			0		1		1			1
12	703	n/a		0	n/a	n/a			0		0		1			1
5	704	n/a		0	n/a	n/a			0		1		1			1
n/a	705	?	?	?		?	?		?		?		?			
N/A	54	n/a	n/a	n/a			2		2		1		1			0
N/A	55	n/a	n/a	n/a			2		1		1		1			0
21	66	n/a	n/a	n/a			2		1		3		1			2
N/A	86	n/a		3	n/a		2		3		1		1			0
N/A	111	n/a		0	n/a	n/a			2		1		1			1
N/A	117	n/a		2	n/a	n/a			3		1		1			0
30	136	n/a	n/a	n/a		n/a			2		2		1			1

Player Code	Athletic Exposure	Injury explaination
1	87	Blocked opp shot in d-zone and had a contusion to his knee
n/a	88	forward attempts to chase down a puck in the n-zone on a breakout but is driven hard into the boards by the d-man
n/a	89	chasing puck on dump in, hit hard into the boards
n/a	89	coming around the net in o-zone, comes out high looking at the net and is hit hard in open ice by CBL forward, didn't see it coming
4	117	attempted to deliver a bodycheck along retreating and tries to hip check opp, gets his ankle caught between player and boards and fractures it
6	118	d-man going back ro retrieve a dump-in gets hit into the boards by an oncoming forward
n/a	147	top of the crease shot block
n/a	148	CBL gives him a spear in front of the net to the mid-section
n/a	176	retrieveing a dump in and was crushed into the boards from behind
n/a	204	n-zone chasing puck, turned his back and was hit from behind into the boards
3	233	Hit from behind along the boards battling for puck
3	233	forward hit hard behind the net, with no board contact, strain to his TMJ and neck, high hit
n/a	234	in a battle in front of his net, teammate comes in to help and hit CBL, while CBL falls his hand gets tangled up and goes off in pair
n/a	235	hit by puck but also received a huge check, not sure which did the damage
11	260	player hit by a dump in
n/a	261	player retrieving a dump in and was hit from behind
7	288	Caught with head down and hit hard along the boards
3	289	caught with his head down coming across the middle n-zone, reinjured a previous TMJ injury
n/a	290	retrieving a dump in and was hit into the boards
n/a	291	retrieving a dump in and was hit into the boards
1	346	skating with head down after puck, 2 players compete for position and recived an elbow to the head
6	376	player attempts to clear the puck from his zone and hit CBL d-man
n/a	377	breaking out with puck and hit in open ice with head down
16	378	stung by puck and play had to be stopped for a period of time, not a missed shift per say due to position but needed time
5	406	going back for dump in and is hit into the boards
5	406	second injury of the game, hit hard in n-zone into the boards and received whiplash symptoms
13	407	retrieving a dump in and was crushed into the boards by opp d-man
n/a	408	receives outlet pass along own b-line, tries to hit his centerman with a pass and is leveled into the boards when doing so
n/a	409	?
3	434	hit from behind into the boards by a d-man
3	434	hit from behind along the boards in d-zone
12	435	trying to retrieve a dump-in and is hit into the boards
9	462	hit in open ice n-zone and jammed his hand and was in visible pain during and after game
n/a	463	hit into boards while chasing puck
11	492	hit into the boards and hurt shoulder in the n-zone
5	493	blocked shot in the d-zone, major contusion on fibula
1	494	skating with head down and hit in the open ice
12	495	scrum around n-zone boards, bigger d-man gets his hands up and levels opp
3	496	confrontation against a d-man and receives a high stick
n/a	497	chases dump in and is hit in danger zone into the boards by bigger player
n/a	498	receives a high stick to the upper chest/neck
1	523	hit hard into the boards in the n-zone and has whiplash symptoms chasing down puck
12	524	hard stand up hit at b-line, hands get up into the head area
n/a	525	Player slashed in the open ice
10	553	head down and hit in open ice
13	554	Hard check into the boards from the side while battling for the puck
n/a	555	hit by own teammates shot
3	584	blocked shot at the top of the crease in d-zone
n/a	585	?
n/a	615	?
2	673	hit into the boards at the d-zone b-line and hurt his ribs
6	674	hit in front on own net in d-zone and fractured his wrist
3	675	cutting to the middle of the ice in n-zone and hit
12	703	head down and hit
5	704	cutting to the middle of the ice in n-zone and hit
n/a	705	?
N/A	54	attempted to hit opposing d-man along the boards in n-zone.
N/A	55	race for the puck along the boards in GLC zone, and is cleanly checked into the boards but falls awkwardly. (doesn't know how to receive a check)
21	66	battle in the corner with opp for puck, did not come in contact with the boards. Opp fell on top of him
N/A	86	D-man coming around his own net and hit into the boards in the corner, clean check but his head hits the glass
N/A	111	player cutting to the middle of the ice on a breakout and gets hit in the open ice hard, beautiful check
N/A	117	player makes pass and receives a finishing check into the boards n-zone, in the danger zone
30	136	tried to hit larger opponent cutting through the middle of the ice and failed

Player Code	Athletic Exposure	End Notes /Game	End Notes /Game	Date	League 0= BT (QC) 1= PW (ON yr2; 2011-12) 2= PW (ON yr1; 2009-10)	Game Type 0= Reg. Season 1= Playoff	Playing Position 0= Defense 1= Forward 2= Goalie	Team 0= BT/PW 1= Opp	Injury 0= No 1= Yes	Discomfort 0= No 1= Yes	Missed Time-Returned 0= No 1= Yes	Missed Time-No Return 0= No 1= Yes	Missed Subsequent Game 0= No 1= Yes	# of Games Missed	Head 0= No 1= Yes	Upper Body 0= No 1= Yes	Lower Body 0= No 1= Yes	Body Checking 0= No 1= Yes	Received Check 0= No 1= Yes	Giving Check 0= No 1= Yes	Into Boards 0= No 1= Yes	Stick 0= No 1= Yes	Stick: Deliberate Play 0= No 1= Yes	Stick: Inadvertent/ Incidental 0= No 1= Yes	Puck 0= No 1= Yes	Other 0= No 1= Yes	Shot Attempt at Net 0= No 1= Yes	Dump in/ Clearing Attempt/ Incidental 0= No 1= Yes	Altercation/ Battle 0= No 1= Yes	Incidental Collision 0= No 1= Yes	Penalty Called 0= No 1= Yes	Boarding (2min) 0=No 1=Yes
N/A	148	5	#9 Cobras goe	22-Oct-11	1	0	1	1	1	0	1	0	0	0	1	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0
N/A	149	5	#26 Cobras w	22-Oct-11	1	0	1	1	1	0	1	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
N/A	206	7	#11 Nepean f	03-Nov-11	1	0	0	1	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
N/A	206	7	#11 Nepean s	03-Nov-11	1	0	0	1	1	0	1	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
19	222	8	G2 gets hit int	05-Nov-11	1	0	0	0	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
29	230	8	G18 is playing	05-Nov-11	1	0	1	0	1	0	0	1	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A	239	8	#5 Blazers get	05-Nov-11	1	0	0	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
N/A	240	8	#26 Blazers g	05-Nov-11	1	0	0	1	1	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A	244	8	#21 Blazers is	05-Nov-11	1	0	1	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
N/A	270	9	#15 Aces gets	06-Nov-11	1	0	0	1	1	0	1	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0
N/A	276	9	#10 Aces get l	06-Nov-11	1	0	1	1	1	0	1	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
19	316	11	G2 hits hit int	13-Nov-11	1	0	0	0	1	0	1	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
20	317	11	G4 cut on bac	13-Nov-11	1	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
27	323	11	G16 recieves	13-Nov-11	1	0	1	0	1	0	0	1	0	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0
N/A	338	11	#5 Aces atten	13-Nov-11	1	0	1	1	1	0	1	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
N/A	339	11	#10 Aces two	13-Nov-11	1	0	1	1	1	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A	339	11	#10 Aces two	13-Nov-11	1	0	1	1	1	0	1	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
N/A	364	12	#4 Grads tries	14-Nov-11	1	0	0	1	1	1	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
N/A	368	12	#8 Grads is hi	14-Nov-11	1	0	1	1	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
N/A	369	12	#81 Grad is sk	14-Nov-11	1	0	1	1	1	1	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
21	378	13	G6 gets hit int	15-Nov-11	1	0	1	0	1	0	1	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
N/A	391	13	#30 Kings (go	15-Nov-11	1	0	2	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
N/A	397	13	#92 Kings trie	15-Nov-11	1	0	1	1	1	0	1	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
N/A	427	14	# 12 Sting hit	17-Nov-11	1	0	1	1	1	0	1	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A	428	14	#9 Sting hit by	17-Nov-11	1	0	1	1	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
29	633	21	G18 hit from l	07-Jan-12	1	0	1	0	1	0	1	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0
N/A	678	22	#75 Grads. Hi	08-Jan-12	1	0	1	1	1	0	0	1	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
30	697	23	G20 'sucker p	11-Jan-12	1	0	1	0	1	0	0	1	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A	704	23	#5 Nepean, w	11-Jan-12	1	0	0	1	1	0	0	1	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0
22	751	25	G8 in vulneral	22-Jan-12	1	0	1	0	1	0	1	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
29	755	25	G18 slashed a	22-Jan-12	1	0	1	0	1	1	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0
N/A	767	25	#9 Cobras, du	22-Jan-12	1	0	1	1	1	1	0	0	0	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
19	806	27	G2- First Incid	26-Jan-12	1	0	0	0	1	0	1	0	0	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
19	806	27	G2- Second In	26-Jan-12	1	0	0	0	1	0	0	1	0	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
21	808	27	G6- "tweaked	26-Jan-12	1	0	1	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
22	809	27	G8 Battling fo	26-Jan-12	1	0	1	0	1	0	1	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	1	0	0
25	811	27	G12 comes ar	26-Jan-12	1	0	1	0	1	0	1	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A	821	27	#6 Rapids, Ge	26-Jan-12	1	0	0	1	1	0	1	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A	826	27	#20 Rapids. O	26-Jan-12	1	0	1	1	1	0	1	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
N/A	855	28	#3 Sting skate	28-Jan-12	1	0	1	1	1	0	0	1	0	0	0	1	0	N/A	N/A	0	N/A	0	0	0	0	0	0	0	0	0	0	0
N/A	856	28	#16 Sting, INC	28-Jan-12	1	0	1	1	1	N/A	N/A	0	0	0	0	1	0	N/A	N/A	0	N/A	0	0	0	0	0	0	0	0	0	0	0
N/A	887	29	#8 Nepean (2	29-Jan-12	1	0	1	1	1	0	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
N/A	887	29	#8 Nepean (2	29-Jan-12	1	0	1	1	1	0	0	1	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0
23	900	30	G10 tries to c	02-Feb-12	1	0	1	0	1	0	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A	917	30	#8 Rapids. Blc	02-Feb-12	1	0	1	1	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
N/A	918	30	#18 Rapids, b	02-Feb-12	1	0	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
33	926	Playoff Game: 1	Field Notes ar	11-Feb-12	1	1	1	0	1	0	0	1	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0
#27 Cobras	927	Playoff Game: 1		11-Feb-12	1	1	0	1	1	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
25	957	Playoff Game: 2	Used PGA; As	13-Feb-12	1	1	1	0	1	n/a	n/a	n/a	0	0	1	0	0	1	n/a	n/a	1	0	0	0	0	0	0	0	0	0	1	0
#12 Cobras	988	Playoff Game: 3		18-Feb-12	1	1	0	1	1	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
20	1020	Playoff Game: 4		25-Feb-12	1	1	0	0	1	1	0	0	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
23	1052	Playoff Game: 5		28-Feb-12	1	1	1	0	1	0	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
#11 Nepean	1053	Playoff Game: 5		28-Feb-12	1	1	0	1	1	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
#8 Nep	1072	Playoff Game: 5	N8 was slashe	28-Feb-12	1	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
#5 Nepean	1083	Playoff Game: 6		29-Feb-12	1	1	0	1	1	0	0	1	n/a	n/a	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0

N.B. An underlined exposure indicates two separate instances of injury (mitch)
N.B any N/A in the data set excluding the "Code" column is the result of incomplete data

Player Code	Athletic Exposure	Hit to the Head (4min) 0=No 1=Yes	Hit to the Head (2min) 0=No 1=Yes	Slashing (2min) 0=No 1=Yes	Tripping (2min) 0=No 1=Yes	Hit From Behind (2min) 0=No 1=Yes	Hit From Behind (5min) 0=No 1=Yes	Roughing (2min) 0=No 1=Yes	Elbowing (2min) 0=No 1=Yes	High Stick (2min) 0=No 1=Yes	First Period 0= No 1= Yes	Second Period 0= No 1= Yes	Third Period 0= No 1= Yes	Mid/open Ice 0= No 1= Yes	Front of Net 0= No 1= Yes	Behind the Net 0= No 1= Yes	Corners 0= No 1= Yes	Along Boards 0= No 1= Yes	Player Height (cm)	Player Weight (kg)	BM	Weight Differential 0=Even 1=Negative 2=Positive	Level of Injury (discomfort) 0=No 1=Yes	Level of Injury (missed shift) 0=No 1=Yes	Level of Injury (period) 0=No 1=Yes	Level of Injury (rest of game) 0=No 1=Yes	Level of Injury (rest of game and more) 0=No 1=Yes	Injury Severity: 0= Finished Game 1= No Return	Location on ice zone = 0 = 1	O-zone N-zone D-zone = 2	Puck situation ARP= 0 PPP = 1 PB = 2
N/A	148	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	N/A	N/A	n/a	0	0	1	0	0	0	0	1	0
N/A	149	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	N/A	N/A	n/a	2	0	1	0	0	0	0	2	1
N/A	206	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	N/A	N/A	n/a	0	0	1	0	0	0	0	0	2
N/A	206	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	N/A	N/A	n/a	1	0	1	0	0	0	0	2	0
19	222	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	144.8	34.96	16.65	0	0	1	0	0	0	0	2	n/a
29	230	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	144.8	44.49	21.19	2	0	0	1	0	0	1	0	1
N/A	239	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	N/A	N/A	n/a	n/a	0	1	0	0	0	0	2	n/a
N/A	240	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	N/A	N/A	n/a	1	0	1	0	0	0	0	0	1
N/A	244	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	N/A	N/A	n/a	0	0	1	0	0	0	0	0	1
N/A	270	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	N/A	N/A	n/a	1	0	1	0	0	0	0	1	n/a
N/A	276	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	N/A	N/A	n/a	0	0	1	0	0	0	0	2	n/a
19	316	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	144.8	34.96	16.65	0	0	1	0	0	0	0	0	1
20	317	0	0	0	0	0	0	0	0	0	0	0	1	N/A	N/A	N/A	N/A	N/A	147.3	40.86	18.83	0	0	0	0	1	0	0	2	n/a
27	323	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	1	152.4	39.95	17.22	0	0	0	0	1	0	1	0	2
N/A	338	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	N/A	N/A	n/a	0	0	1	0	0	0	0	0	n/a
N/A	339	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	N/A	N/A	n/a	0	0	1	0	0	0	0	1	n/a
N/A	339	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	N/A	N/A	n/a	0	0	1	0	0	0	0	0	2
N/A	364	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	N/A	N/A	n/a	1	1	0	0	0	0	0	2	0
N/A	368	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	N/A	N/A	n/a	1	0	1	0	0	0	0	0	2
N/A	369	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	N/A	N/A	n/a	1	0	1	0	0	0	0	0	1
21	378	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	152.4	47.67	20.55	0	0	0	1	0	0	0	0	n/a
N/A	391	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	N/A	N/A	n/a	0	0	1	0	0	0	0	2	0
N/A	397	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	N/A	N/A	n/a	0	0	1	0	0	0	0	2	1
N/A	427	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	N/A	N/A	n/a	1	0	1	0	0	0	0	0	n/a
N/A	428	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	N/A	N/A	n/a	n/a	0	0	1	0	0	0	0	n/a
29	633	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1	144.8	44.49	21.19	2	0	1	0	0	0	0	0	2
N/A	678	0	0	0	0	0	0	0	0	0	0	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	n/a	1	0	0	1	0	0	1	2	1
30	697	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	143	38.59	18.92	1	0	0	1	0	0	1	2	1
N/A	704	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	N/A	N/A	n/a	0	0	0	0	1	0	1	2	n/a
22	751	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	149.9	54.03	24.12	0	0	1	0	0	0	0	1	n/a
29	755	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	144.8	44.49	21.19	0	0	1	0	0	0	0	0	n/a
N/A	767	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	N/A	N/A	n/a	0	1	0	0	0	0	0	0	n/a
19	806	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	144.8	34.96	16.65	1	0	0	1	0	0	0	0	1
19	806	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	144.8	34.96	16.65	1	0	0	1	0	0	1	2	n/a
21	808	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	152.4	47.67	20.55	n/a	0	0	0	1	0	1	1	0
22	809	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	149.9	54.03	24.12	1	0	1	0	0	0	0	2	2
25	811	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	142.2	34.05	16.86	1	0	1	0	0	0	0	2	n/a
N/A	821	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	N/A	N/A	n/a	0	0	1	0	0	0	0	2	n/a
N/A	826	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	N/A	N/A	n/a	1	0	1	0	0	0	0	0	2
N/A	855	0	0	0	0	0	0	0	0	0	0	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	n/a	?	0	0	0	1	0	1	?	?
N/A	856	0	0	0	0	0	0	0	0	0	0	0	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	n/a	?	0	1	0	0	0	N/A	?	?
N/A	887	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	N/A	N/A	n/a	1	0	1	0	0	0	0	0	n/a
N/A	887	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	N/A	N/A	n/a	1	0	0	1	0	0	0	2	1
23	900	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	152.4	45.4	19.57	0	0	1	0	0	0	0	0	n/a
N/A	917	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	N/A	N/A	n/a	n/a	0	1	0	0	0	0	2	n/a
N/A	918	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	N/A	N/A	n/a	n/a	0	1	0	0	0	0	2	n/a
33	926	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	139.7	41.77	21.42	2	0	0	0	1	0	1	2	1
#27 Cobras	927	0	0	0	0	0	0	0	0	0	0	0	1	n/a	n/a	n/a	n/a	n/a	N/A	N/A	n/a	?	0	1	0	0	0	0	?	?
25	957	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	142.2	34.05	16.86	1	1	0	0	0	0	0	0	n/a
#12 Cobras	988	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	N/A	N/A	n/a	1	0	1	0	0	0	0	2	1
20	1020	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	147.3	40.86	18.83	1	0	0	0	0	1	1	1	n/a
23	1052	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	152.4	45.4	19.57	0	0	0	1	0	0	0	0	0
#11 Nepean	1053	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	N/A	N/A	n/a	1	0	1	0	0	0	0	1	n/a
#8 Nep	1072	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	N/A	N/A	n/a	0	0	1	0	0	0	0	2	n/a
#5 Nepean	1083	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	N/A	N/A	n/a	n/a	0	0	1	0	0	1	2	n/a

Player Code	Athletic Exposure	Hit by puck BS = 0 clearing =1 dump in =2	Action with puck stickhandle = 0 reception = 1 puck passing = 2 shooting = 3	Confrontation After whistle = 0 During game = 1	Battle for Puck off = 0 net = 1 face-front of against boards =2	Attentional Focus = 0 head down incoming puck = 1 on opponent = 2 where puck is aimed =3	Principal point of contact head/neck = 0 upper = 1 lower = 2 back/spine = 3	Aggression retaliatory action = 0 non-retaliatory action = 1	Body-check type contact = 0 contact = 1 side front behind = 2 hit from hip check = 3
N/A	148	n/a	n/a	n/a	n/a	2	0	1	1
N/A	149	n/a	2	n/a	2	1	1	1	0
N/A	206	n/a	0	n/a	2	0	3	1	2
N/A	206	n/a	n/a	n/a	2	2	1	1	0
19	222	n/a	2	n/a	n/a	3	1	1	0
29	230	n/a	3	n/a	n/a	0	1	1	1
N/A	239	0	n/a	n/a	n/a	2	1	1	n/a
N/A	240	n/a	3	n/a	2	1	0	1	1
N/A	244	n/a	n/a	n/a	n/a	2	1	1	n/a
N/A	270	n/a	1	n/a	n/a	1	0	1	0
N/A	276	n/a	0	n/a	n/a	0	1	1	1
19	316	n/a	3	n/a	n/a	3	2	1	0
20	317	n/a	n/a	n/a	1	0	2	1	n/a
27	323	n/a	0	n/a	2	0	3	1	2
N/A	338	n/a	n/a	n/a	1	2	1	1	1
N/A	339	n/a	2	n/a	n/a	3	1	1	0
N/A	339	n/a	0	n/a	2	0	1	1	0
N/A	364	n/a	n/a	n/a	1	2	1	1	1
N/A	368	n/a	1	n/a	2	0	3	1	2
N/A	369	n/a	2	n/a	2	1	1	1	0
21	378	n/a	0	n/a	n/a	2	2	1	0
N/A	391	n/a	n/a	n/a	1	1	2	1	n/a
N/A	397	n/a	1	n/a	n/a	1	1	1	1
N/A	427	n/a	0	n/a	n/a	0	1	1	0
N/A	428	1	n/a	n/a	n/a	2	2	1	n/a
29	633	n/a	0	n/a	2	0	3	1	2
N/A	678	n/a	1	n/a	2	1	1	1	0
30	697	n/a	1	n/a	n/a	1	1	1	1
N/A	704	n/a	3	n/a	n/a	0	1	1	0
22	751	n/a	3	n/a	n/a	3	0	1	0
29	755	n/a	0	n/a	n/a	3	2	0	n/a
N/A	767	n/a	3	n/a	n/a	3	3	1	2
19	806	n/a	2	n/a	n/a	1	0	1	0
19	806	n/a	2	n/a	2	2	0	1	1
21	808	n/a	n/a	n/a	n/a	2	n/a	n/a	n/a
22	809	n/a	n/a	n/a	2	2	1	1	0
25	811	n/a	0	n/a	n/a	0	0	1	0
N/A	821	n/a	0	n/a	n/a	0	1	1	1
N/A	826	n/a	n/a	n/a	0	0	0	1	n/a
N/A	855	?	?	?	?	?	?	?	?
N/A	856	?	?	?	?	?	?	?	?
N/A	887	n/a	2	n/a	n/a	3	0	1	1
N/A	887	n/a	n/a	n/a	2	1	1	1	1
23	900	n/a	0	n/a	n/a	0	2	1	0
N/A	917	0	n/a	n/a	n/a	2	2	1	n/a
N/A	918	0	n/a	n/a	n/a	2	2	1	n/a
33	926	n/a	n/a	n/a	n/a	1	1	1	0
#27 Cobras	927	?	?	?	?	?	?	?	?
25	957	n/a	0	n/a	n/a	0	1	1	0
#12 Cobras	988	n/a	2	n/a	2	1	1	1	1
20	1020	n/a	0	n/a	n/a	0	0	1	0
23	1052	n/a	n/a	n/a	n/a	2	1	1	n/a
#11 Nepean	1053	n/a	1	n/a	n/a	1	1	1	1
#8 Nep	1072	n/a	n/a	n/a	n/a	2	1	0	n/a
#5 Nepean	1083	0	n/a	n/a	n/a	2	2	1	n/a

Player Code	Athletic Exposure	Injury explaination	
N/A	148	attempts to hit d-man and misses. Runs head first into the boards, n-zone	
N/A	149	gets puck and receives check along the boards b-line in d-zone by the bench	
N/A	206	opp tries to protect puck in GLC corner and get run from behind and no call was made (tried to reverse play and gave up his back)	
N/A	206	tries to hit GLC in corner and hurts his shoulder in the process	
19	222	passes the puck and takes unsuspected check along the boards from the side	
29	230	hit hard in front of net, slow to get up and bruised his knee	
N/A	239	hit by puck on slapshot and then has his own teammate falls on him	
N/A	240	goes to play loose puck in open ice and gets hit by GLC D-man	
N/A	244	reaching for puck and had his hand punched and left the ice	
N/A	270	head down and standing still in the middle of the ice and gets hit, blind sided and elbowed to the face, trainer performs concussion tests	
N/A	276	breaking out from his own zone is stood up at b-line by d-man GLC, nice hit	
19	316	rib injury, trying to keep the puck in at the b-line and falls into the boards due to a check (PK)	
20	317	player stepped on his leg while on the ground, laceration and needed stitches	
27	323	delays in the o-zone and gets crushed from behind into the boards, neck injury	
N/A	338	attempts to hit D-man GLC and gets stood up in front of the net (lower body)	
N/A	339	admires his pass and gets hit hard along the boards, n-zone sandwiched into the boards more than anything	
N/A	339	opp attempts to turn back along the boards and is sandwiched by the d-man behind GLC net	
N/A	364	tried to hit larger player and fell, front of net	
N/A	368	puck comes around the boards in o-zone, player attempts to protect the puck along the baords with his body and is driven head first into the boards by larger d-man	
N/A	369	hit in the corner into the boards after going after the puck by GLC d-man, skates hunched over to the bench	
21	378	carrying puck deep into o-zone, is angled off by opp d-man, player loses balance and falls awkwardly into the boards	
N/A	391	own player falls on top of the goalie while he attempts to make a save. Falls on his leg (knee)	
N/A	397	stood up by d-man as puck is cleared around to his side, leaves ice	
N/A	427	hit in open ice while carrying the puck, looked harmless	
N/A	428	hit by a clearing attempt in the open ice from opp	
29	633	knee injury, checked from behind along the boards trying to protect the puck	No video
N/A	678	shoulder injury after being hit into boards chasing a dump in	no video
30	697	looking back for pass and is smashed by opp d-man in open ice around the b-line of d-zone	
N/A	704	Took a slap shot to clear the puck from behind his net and was hit fromthe side/back (maybe) into the boards by a forward. Needed help off the ice. (ankle)	
22	751	gets hit into the boards by the bench after dumping a puck in, should have been a charge as the player accelerated into him and got his hands up	
29	755	cutting to the net in open ice and is slashed to the leg/ankle visciously twice	
N/A	767	receives a check after taking a shot on net, slides into the boards and labours the rest of the shift	
19	806	D-man pinches to hold puck in and reaches for it, get a elbow to the face (sore neck)	
19	806	player makes outlet pass from behind net, standing still a large opp comes in and finishes a check that lands up high, neck and head region, boards are involved, headache and sore neck was told after the game	
21	808	restrained groin from skating on a nothing play, no contact was involved	
22	809	hurt his upper body battling along the boards	
25	811	Comes around the net and gets laid out and needs trainers attention. No boards involved, blind sided though, hands to the face	
N/A	821	comes around the net and get lined up by forechecker, trainer takes him off the ice. Lower body, and open ice. GLC left his feet and got his hands up	
N/A	826	takes a stick to the neck right off the face-off	
N/A	855	? No footage	no video
N/A	856	? No footage	no video
N/A	887	Upper body, after making a pass in open ice, player tries to evade the check but fails	
N/A	887	puck comes to the point, forward attempts to poke it out and gets stood up hard by GLC d-man. went right to dressing room, left with ice pack on neck. Open ice hit at b-line	
23	900	possible charlie horse, hit while carrying the puck in open ice, looked innocent, in o-zone	
N/A	917	hit by a shot in front of the net, falls multiple times going to bench, hit in the leg	
N/A	918	leg injury, blocked shot in own zone in front of net	
33	926	hit by player into the boards while chasing down a puck	no video
#27 Cobras	927	? No clip	no video
25	957	head injury, skating with head down and hit by a player into the boards	no video
#12 Cobras	988	d-man goes back to get puck behind the net and is hit into the boards by oncoming GLC D-man on rush/dump in	
20	1020	skating up the ice is hit by 3 opp players and goes to bench. Player takes a trial lap and doesn't play, has a history of head injury, was diagnosed with a concussion	no video
23	1052	outlet pass by d-man behind net, opp comes in to cut it off and get follow through	
#11 Nepean	1053	Receives pass with head down and is flattened, open ice	
#8 Nep	1072	receives a slash to the mid section from d-man for no apparent reason while covering his point	
#5 Nepean	1083	lower body, hit by a shot in front of the net	