ICE HOCKEY INJURIES

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The popularity of the sport of ice hockey has grown steadily throughout the past decade. Despite decreased participation in a number of contact youth sports, participation in youth ice hockey has grown every year since 2009 according to USA Hockey. The growing popularity of the sport seems inevitable—ice hockey is an exciting, face paced, and physical sport that is exciting to play and watch.

Hockey requires strength, agility, and endurance, as well as excellent hand-eye coordination. Depending upon the level of play, athletes are often moving on their skates at speeds up to 30 mph and shooting the puck at speeds upwards of 100 mph. The sport is exhilarating for both participant and spectator.1

Injury Epidemiology

As with any high-speed collision sport, injuries in ice hockey are common. Despite improvements in protective padding for all players and the institution of mandatory helmet and facemask rules, injury rates in American collegiate hockey remain high compared to other collegiate sports monitored by the National Collegiate Athletic Association (NCAA) Injury Surveillance System (NCAA-ISS). The overall injury rate for collegiate hockey players is almost five injuries per 1000 athlete exposures (AE)—defined as a single player participating in a single game or practice.1 Interestingly, injuries occur more than six times as often in games than in practice (13.8 versus 2.2 injuries per 1000 AEs in practice versus games).1 This translates into 65% of all hockey injuries occurring in games, even though games only account for 23% of all athlete exposures. This can be attributed to the violence and aggressive nature of the sport when it is played at full intensity. Collisions with another player or the boards account for more than 50% of all injuries, and thus it is easy to understand how the frequency of injury increases in proportion to the frequency and intensity of collisions during game play as opposed to practice. Others have found similarly high rates of injury in ice hockey at other levels, including American Junior A level hockey and the Winter Olympics.1,2

Injuries to the head and face, including concussions and lacerations, are the most commonly injured body part in hockey players across all levels of play, reported as accounting for up to 39% of game injuries.3 In the United States, participants in collegiate and youth organized ice hockey are now required to wear a face mask which has dramatically reduced the laceration risk in these athletes. Concussion still remains the single most common injury across all levels, with an incidence of 18.6% of all injuries sustained and accounts for the second-most amount of time lost from practice or games due to injury.1 The next most common injuries include knee medial collateral ligament sprains, acromioclavicular joint injuries, and ankle sprains.

Player position has been examined as it relates to risk of injury. While forwards and defensemen have similar reported overall rates of injury (5 injuries per 1000 AEs), goalies have significantly lower rates of injury (2.7 injuries per 1000 AEs).1
Interestingly, position plays an even more important role in the risk of concussion, with studies reporting a 2.1 times increased risk of concussion for forwards as compared to defensemen. Some variability has been reported across levels of play, styles of play (American “dump and chase” versus European), and size of rink (American 1560 m² versus European 1800 m²).

In light of the reported collision data, body checking has received significant attention over the past decade as a potential risk factor associated with injury, especially in youth hockey. In 2011, USA Hockey increased the age at which body checking was allowed from Pee Wee (age 11–12 years) to Bantam (age 13–14 years). Studies evaluating the epidemiology of injury patterns in the Pee Wee age group before and after the change demonstrate a remarkable difference. Following the rules change, there was an almost 20% decrease in overall injury, with a 23% drop in fractures and a 41% drop in internal organ damage.

Shoulder Injuries
Injuries to the shoulders of ice hockey players are common. The risk of upper extremity injury is influenced by player position with upper extremity injuries occurring most frequently in forwards. The most common upper extremity injury sustained is that of an acromioclavicular (AC) joint sprain, accounting for 59% of all shoulder injuries. The most common mechanism of AC joint injury is a direct blow to the acromion, either via direct contact with another player or with the boards, as often happens during a body check. These injuries can result in significant amounts of playing time loss for the athlete with one study demonstrating an average of 18 days lost after an AC joint sprain in collegiate athletes. Fortunately, most AC joint sprains, including Type I, Type II, and even many Type III injuries, can be treated non-operatively with rest, icing, NSAIDs, and additional protective equipment worn to prevent joint aggravation.

Glenohumeral labral injuries also frequently occur in ice hockey, often through a collision mechanism, and the player may sustain an anterior or posterior subluxation/dislocation event depending upon the position of the shoulder at the time of contact. Glenohumeral joint injury accounted for 40.4% of upper extremity injuries in a recent 7-year study of the international ice hockey federation adult world championship tournaments and Olympic Winter Games. In players without previous history of shoulder instability or pathology, and without an osseous component to injury, it is sometimes possible to return to play with a program of rehabilitation, including range of motion and strengthening and possible bracing. In athletes who have persistent instability symptoms, surgical stabilization may be required with an average return to sport in 4–6 months.

Knee Injuries
Knee and leg injuries account for 22% of all ice hockey injuries. Injury to the medial collateral ligament is the most commonly injured knee structure, encompassing 56.6% of all injuries to the knee with a reported incidence of 0.44 injuries per 1000 AEs. The most common mechanism of injury is collision with another player or the boards during body checking (77% of injuries). These injuries typically result in several days to weeks of lost playing time to injury, with one study demonstrating a direct relationship between grade of injury and time lost (grade 1: 2–4 days, grade 2: 10–19 days, and grade 3: 127 days). These injuries are frequently treated non-operatively with a rehabilitation program, taping, and/or bracing. Some grade III injuries, especially with avulsion of the tibial insertion, may be candidates for operative fixation.

ACL tears of the knee are relatively infrequent injuries, as compared to other injuries, with 67 ACL tears sustained during a 10-year period in the National Hockey League from 2006–2015. Incidence for all professional players was 0.42/1000 player game hours. While infrequent, these injuries usually require surgical reconstruction and have a significant impact on player performance.
Not only does the player require a significant amount of time off for surgical recovery and rehabilitation, but performance data following return to play demonstrates an initial decrease in goals per season, goals per game, points per game, and points per season as compared to uninjured controls.8

Ankle Sprains
One injury that is relatively common in ice hockey players and somewhat unique to the sport is syndesmosis injury or “high ankle” sprain. The predisposition to this injury, which occurs when excessive torque is applied to the lower extremity, lies in the combination of the elevation of the player off the ice from the hockey skate blade along with the high speeds and rapid direction changes that can occur when skating at speeds of up to 30 mph. The stiffness of the hockey boot adequately supports the ankle, but can leave the lower leg just above the boot at risk for rotational injury. Foot and ankle injuries have been shown to account for 12% of all hockey injuries in collegiate hockey players.1 Syndesmosis injuries have been shown to account for the most playing time lost of all hockey injuries, with a mean of 5.4 games and 14.6 practices missed.1

Gender Differences
Men sustain higher rates of injury than women across all ages and levels of play, yet the predominant mechanism of injury is player contact for both genders, despite the difference in rules with respect to body checking. In youth and adolescent level hockey, boys averaged 36 injuries/1000 hours as compared to girls averaging 34.5 injuries/1000 hours. In collegiate level hockey, those differences are smaller with comparative studies reporting only 1.4 more injuries in men per 1000 exposures.10 Both men and women sustain at least twice as many injuries in games as compared to practices—likely attributed to the decreased frequency and intensity of player contact, the most frequent mechanism of injury. Game injury rates have been reported as 5 and 8 times higher than practice injury rates for women and men, respectively.10 Both men and women sustain a majority of injuries (46%) to the head and face. However, concussion rates differ, with these injuries accounting for 17% of injuries in women and 8% in men.10 Location of extremity injuries also differ by gender, with men having a higher percentage of injuries to the shoulder (13%) and women having more injuries to the thigh (17%) and knee (15%).10 The larger percentage of upper extremity injuries in men has been attributed to the allowance of body checking in older age groups.

Conclusion
Ice hockey is a high-speed collision sport that brings with it a high risk of injury. The majority of injuries are caused by player contact, and the rates and locations of injury vary by gender, player position, and age group. The majority of injuries are minor contusions or sprains, do not require surgery, and do not lead to significant lost time from competition. More investigation into injury patterns, particularly as they relate to the increased concussion risk in women—for whom body checking is not allowed in the rules—may potentially lead to improvements in player protective measures such as equipment improvements or rules modifications.
REFERENCES


