

POSITION STATEMENT



Bodychecking in youth ice hockey

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Abstract

Hockey is one of the most popular sports for Canadian children and youth. While the health benefits of physical activity and sport participation are well recognized, there is increasing concern around the frequency and severity of hockey-related injuries, particularly concussion. Studies consistently identify bodychecking as the primary mechanism associated with youth hockey injuries, including concussion. Policy to delay bodychecking until bantam league play (when participants are 13 to 14 years of age) will reduce the risks of injury and concussion in young ice hockey players. Bodychecking should be eliminated from non-elite youth ice hockey. The age at which bodychecking is introduced in competitive hockey leagues must be reconsidered. Both initiatives require policy change in many provinces/territories, and must be re-evaluated prospectively in light of emerging research.

Key Words: *Bodychecking; Concussion; Ice hockey; Injury; Sport; Youth*

More than 4.5 million Canadians are involved in ice hockey, as coaches, officials, administrators or direct volunteers, and hockey is the most popular winter sport among Canadian children and youth.^[1] Hockey Canada reported over 550,000 registered players under the age of 19 in 2008, and participation rates are increasing, especially among girls and young women.^[1] While the health benefits of physical activity and sport participation are well recognized, there is increasing concern around the frequency and severity of hockey-related injuries in youth, particularly concussion. The American Academy of Pediatrics (AAP) classifies hockey as a collision sport because of unintentional and intentional body contact, including bodychecking.^[2]

The AAP published a policy statement on youth ice hockey in 2000, recommending that bodychecking not be allowed for children younger than 15 years of age.^[3] There is passionate debate about the risk factors for injury in youth hockey and the relative merits of early or later introduction of bodychecking. Because bodychecking is not allowed in girls' or

women's hockey in Canada, the present statement pertains to play in boys' and men's hockey leagues. It reviews the scientific literature on bodychecking injuries, outlines positions in the current debate and makes recommendations on when bodychecking should be introduced into the game.

Defining body contact and bodychecking

Body contact is an individual defensive tactic designed to legally block or impede the progress of an offensive puck carrier. The defensive player moves to restrict action by the puck carrier anywhere on the ice, by skating, angling and positioning. The defensive player cannot hit the offensive player by travelling in an opposite direction to him or by physically extending toward him in an effort to initiate contact. There must be no action where the puck carrier is pushed, hit or shoved into the boards. In contrast, **bodychecking** is an individual defensive tactic designed to legally separate the puck carrier from the puck. The defensive player physically extends his body toward the puck carrier while moving in an opposite or parallel direction, a deliberate and forceful move not solely determined by the movement of the puck carrier.^[1] Bodychecking is taught based on a four-step skill development program outlined by Hockey Canada, with progression through positioning and angling, stick checking, body contact and bodychecking skills.^[4] Instruction in bodychecking includes techniques for receiving bodychecks, adhering to rules, and safe play.

Bodychecking legislation

Hockey Canada groups children and adolescents by age into six play levels: initiation (5 to 6 years of age), novice (7 to 8 years), atom (9 to 10 years), peewee (11 to 12 years), bantam (13 to 14 years), and midget (15 to 17 years). Historically, from the early 1980s until the 2002/2003 season, bodychecking was introduced at age 12 years in Canadian boys' ice hockey. In 2003, four of 13 provincial/territorial branches allowed checking for players as young as nine years old. Hockey Canada mandated the introduction of bodychecking in peewee leagues (ages 11 to 12) in 2009. Quebec has delayed bodychecking until bantam (age 14 from 1978 to 2002, then age 13 following an age change mandated nationally).



The debate

Despite lack of evidence, proponents of bodychecking argue that it is a fundamental skill which, learned early, may prevent future injuries. However, the evidence supports that bodychecking is the most common mechanism of injury. The Canadian Academy of Sports Medicine recommends that bodychecking be introduced only in boys' competitive hockey, and no earlier than the bantam (ages 13 to 14) or midget (ages 15 to 17) level.^[5] The AAP recommends a ban on bodychecking for male players younger than 15 years of age.^[3] The present statement marks the first CPS position on this issue.

Bodychecking and injury


Hockey is recognized as a high-risk sport. The speed of play, body contact and bodychecking all contribute to injury risk.^[6] The injury rate is also high, with Canadian data suggesting that hockey injuries account for 8% to 11% of all adolescent sport-related injuries.^{[8][10]} Unfortunately, serious injuries such as concussion, other brain injuries and spinal cord trauma are not uncommon in hockey.^{[6][11]} The incidence of traumatic brain injury appears to be rising.^{[12][13]} Ice hockey-related fatality rates are double those reported in American football, and catastrophic spinal cord and brain injury rates are almost four times higher for high school hockey players than for high school and college football players.^{[14][15]} Bodychecking is the predominant mechanism of injury among youth hockey players at all levels of competition where it is permitted, accounting for 45% to 86% of injuries.^{[8][16][18]} Several published studies, including two recent systematic reviews, reported on risk factors for injury (including bodychecking) in youth hockey.^{[19][20]} Emery and colleagues conducted a systematic review of 24 studies and a meta-analysis including only studies which examined policy allowing bodychecking as a risk factor for injury. Policy allowing bodychecking was found to be a risk factor for all hockey injuries, with a summary incidence rate ratio (IRR) of 2.45 (95% CI 1.7 to 3.6). Furthermore, policy allowing bodychecking was found to be a risk factor for concussion, with a summary OR of 1.71 (95% CI 1.2 to 2.44). These data confirm that bodychecking increases the risk of all injuries and the risk of concussion specifically.^[20] Nine of ten studies examining policy allowing bodychecking provided evidence to support a greater risk in bodychecking leagues.^[20] The second systematic review found the RR of injury associated with policy allowing bodychecking ranged from 0.6 to 39.8; all but one of these studies found an increased risk of injuries associated with bodychecking.^[19]

Since the publication of these systematic reviews there have been five additional studies. A Canadian prospective cohort study compared injury rates between peewee ice hockey players in a league where bodychecking is permitted at age 11 years (Alberta) versus players in a league where bodychecking is not permitted until age 13 (Quebec).^[21] During the 2007/2008 season, a validated injury surveillance system was used to capture all injuries requiring medical attention and/

or time loss from hockey (ie, time between injury and return to play) in 2154 players. There was a threefold increased risk of all game-related injuries (IRR =3.26 [95% CI; 2.31 to 4.60]) and of injury resulting in >7 days time lost from sport (IRR=3.30 [95% CI; 1.77 to 6.17]) in 11- to 12- year-old peewee players from Alberta when compared with Quebec. There was also an almost fourfold increased risk of game-related concussion (IRR=3.88 [95% CI; 1.91 to 7.89]) in Alberta peewee players.^[21] Further evidence was reported in a five-year cohort study (2002 to 2007) including all age groups, which demonstrated that injury risk increases 3.75 times (IRR=3.75 [95% CI; 1.51 to 9.74]) in leagues that allow bodychecking compared with those that do not.^[22]

A second prospective cohort study by Emery et al examined whether the introduction of bodychecking at 11 years of age (Alberta) or 13 years of age (Quebec) affected injury rates in later years (at 13 to 14 years of age).^[23] During the 2008/09 season, the same injury surveillance system cited above was used to study 1971 bantam players (13- to 14-year-olds). There was no reduction in game-related injury risk (all injuries) for this age group (IRR=0.85 [95% CI 0.63 to 1.16]), of concussion specifically (IRR=0.84 [95% CI 0.48 to 1.48]), or of concussions resulting in >10 days time lost from sport (IRR=0.6 [95% CI 0.26 to 1.41]) in the Alberta league, compared with Quebec. In fact, the concussion rate found in Alberta peewee players was higher than in bantam players in either province.^{[22][23]} Injuries to bantam players resulting in >7 days time lost from sport were reduced by 33% (IRR=0.67 [95% CI 0.46 to 0.99]) in the Alberta league, where players had had two years of bodychecking experience. However, these findings must be interpreted in light of the three- to fourfold greater injury and concussion risk among peewee players in Alberta, along with a possibly higher 'survival effect' among peewee players moving on to bantam in Quebec when compared with Alberta, where bodychecking is allowed in peewee league play.

Recent retrospective studies have examined the influence of policy change based on the Canadian Hospitals Injury Reporting and Prevention Program (CHIRPP) surveillance data. Injury rates among boys presenting to emergency departments in the Kingston, Ontario area both before and after the 2002 rule change to allow bodychecking in younger players, were reported. There was no change between bodychecking injury rates in 1997 to 2002 (with bodychecking introduced at 11 years of age) and 2003 to 2007 (when bodychecking was introduced at nine years of age).^[24] Overall rates of injury actually declined over the later period.^[24] However, this retrospective study may also be biased by stronger rule enforcement, better coaching certification and temporal declines in emergency department use for this type of injury over that period. In contrast, retrospective research of CHIRPP data from 1994 to 2004 in five Ontario hospitals examined injury risk following a rule change in 1998 that allowed bodychecking in nine- and 10-year-old hockey players. A 2.2 times greater risk of injury in atom players (9 and 10



years of age) after the rule change was reported (OR=2.2 [95% CI 1.7 to 2.84]).^[25] Another retrospective study using CHIRPP data (from 1995 to 2002) compared hockey injuries in children 10 to 13 years of age playing in Ontario, where bodychecking was allowed, with data from Quebec, where bodychecking was not allowed. There was a 2.6 times greater risk of bodycheck-related injuries reported for this age group when bodychecking was allowed (OR=2.65 [95% CI 2.21 to 3.18]).^[26]

Other risk factors

After policy that permits bodychecking, the most commonly investigated risk factors for injury in the scientific literature are: age, session-type (ie, a practice versus a game), level of play, player position, physical size, and a previous history of injury and/or concussion. Most studies examining age found that injury risk increased with age,^{[8][20][27][29]} others suggest no elevated injury risk in older age groups.^{[30][33]} Relative age has been examined to “describe the potential advantages (or disadvantages) that result from age differences between peers within one age group”.^[31] One study examining relative age among hockey players found no evidence that younger (or older) players within a grouping were at elevated injury risk.^[31] Additional research supports this finding at the peewee level, where no increased risk was found in first-year players. In bantam leagues, however, there was a 40% greater risk of injury in first-year players when compared with players in their second year.^{[21][23]}

Based on session-type, injury risk is reported to be consistently higher in games than in practices, with RR estimates ranging from 2.45 to 6.32.^{[16][18][27][34]} One study also indicated that injury rates were higher in regular season play than during preseason, postseason or tournament games.^[30]

In general, studies examining level of play have found that injury risks rise with increasing skill levels across all age groups.^{[31][35][36]} However, one study reported that only peewee players in the highest skill division were at the greatest risk of injury, with no significant increase by skill level in other age groups.^[8] Larger cohort studies confirmed a consistently greater risk of injury among peewee players who were more highly skilled, but this trend was not observed in the bantam age group.^{[21][23]}

When examining player position, some researchers found that forwards were at higher risk of injury than defencemen or goalies,^{[30][32]} while others reported the relative risk of injury was 2.18 times higher for defencemen than forwards.^[27] In all three studies, goalies were shown to be at much lower risk than other players. Additional research shows a consistent protective effect for goalies at both the peewee and bantam levels.^{[21][23]}

Research on player size has shown conflicting results, with some studies citing increased risk for smaller players in some

age groups. Prospective Canadian data show a significantly greater risk of injury in peewee players in the lowest 25th percentile by weight,^[21] though this finding was not reflected in the bantam cohort.^[23] However, additional research has found lighter bantam players to be at greater risk, while other studies report a significant weight difference, at all levels, between players who sustained a bodychecking-related injury and those who did not.^{[16][30]} Other research examining body weight as a risk factor for shoulder injuries found that heavier players were at greater risk for these injuries.^[37] One study looked at height as a possible risk factor for injury and found no evidence of effect among bantam players.^[16]

By contrast, a history of previous injury or concussion is consistently reported as a significant risk factor for reinjury and further concussion, respectively.^[20] One recent Canadian peewee cohort study showed that the risk of injury doubled for players who reported being injured within the past year (IRR=2.07 [95% CI 1.49 to 2.86]), while the risk of concussion tripled for players reporting any previous concussion (2.76 [95% CI 1.1 to 6.91]).^[21] The bantam cohort also showed greater risk of reinjury and concussion in players reporting previous injury within the past year (IRR=1.39 [95% CI 1.13 to 1.71]) or any previous concussion (IRR=1.87 [95% CI 1.19 to 2.94]), respectively.^[21]

Injury prevention and risk reduction

Injury prevention and risk reduction programs have been implemented but have not been evaluated rigorously. The STOP (Safety Towards Other Players) program (www.safetytowardsotherplayers.com) is supported by the Ontario Minor Hockey Association (www.omha.net), and includes an education component and the “STOP patch”, which is sewn on the back of players’ uniforms to remind opponents not to hit from behind. A study evaluating another injury prevention program, “Fair Play”, which awards points for sportsmanlike play (based on penalty minutes), suggests an approximate 60% reduction in the risk of injury (OR=0.41 [95% CI 0.11 to 1.47]) where the program is in effect, but the results were not statistically significant.^[38]

Education

Players, parents, coaches, officials and trainers must be mindful of the potential risks of playing hockey. Hockey Canada has player development, coaching, education and safety promotion programs and resources for coaches, officials, players and parents at www.hockeycanada.ca. Concussion awareness is vital. Athletes and all those involved in their care need to know about the risks, symptoms/signs and how to manage concussive injuries. The CPS statement on concussion evaluation and management is essential reading^[39], with additional information available from the Canadian Academy of Sport and Exercise Medicine (www.casm-acms.org), ThinkFirst Canada (www.thinkfirst.ca) and the US Centers of Disease

Control and Prevention (www.cdc.gov/ncipc/tbi/Coaches_Tool_Kit.htm).

Conclusion

Studies consistently identify bodychecking as the primary mechanism of hockey-related injuries, including concussion. It is expected that delaying the introduction of bodychecking until the bantam level and restricting bodychecking to elite leagues for older age groups will reduce the risks of injury and concussion substantially. Delaying bodychecking until bantam will have a clear benefit in reducing the risks of injury and concussion in young ice hockey players. Bodychecking should be eliminated from recreational youth ice hockey and the age at which it is introduced in competitive hockey leagues should be reconsidered. Both initiatives require policy change in many provinces/territories in Canada, and policy changes will need to be evaluated on a regular basis in light of emerging research.

Recommendations

The Canadian Paediatric Society recommends the following:

- Eliminating bodychecking from all levels of organized recreational/non-elite competitive male ice hockey. (Grade II-2A evidence) *
- Delaying the introduction of bodychecking in elite male competitive leagues until players are 13 to 14 years of age (bantam level) or older. (Grade III-C evidence)*
- Implementing Hockey Canada's four-stage skill development program for bodychecking (body positioning, angling, stick checking and body contact) for all leagues.
- Educating coaches and trainers, schools, and policy-makers in sport about the signs and symptoms of common hockey injuries, especially concussion.
- Improving injury surveillance to better identify the risk factors for, and mechanisms of, hockey injuries.
- Policies to reduce injury and promote fair play in hockey, for all age groups and league levels.

Clinicians who see young hockey players in their practice should offer the following advice:

- Girls and young women should continue participating in non-bodychecking leagues.
- Boys should play in recreational/non-elite hockey leagues that do not allow bodychecking.
- Elite male players should play in hockey leagues that introduce bodychecking later, when players are 13 to 14 years of age (bantam level) or older.
- All players should adhere to fair play and a non-violent sport culture.
- Parents and caregivers should learn injury prevention and risk reduction strategies, including concussion prevention, recognition and management.



*The levels of evidence and strength of recommendations are based on the Canadian Task Force on Preventive Health Care (See Appendix).¹⁴⁰¹¹⁴¹¹

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Appendix





Levels of evidence and strength of recommendations

Level of evidence	Description	Grade	Description
		A	There is good evidence to recommend the clinical preventive
		B	There is fair evidence to recommend the clinical preventive a
		C	The existing evidence is conflicting and does not allow a reco
I	Evidence obtained from at least one properly randomized controlled trial.	D	There is fair evidence to recommend against the clinical prev
II-1	Evidence obtained from well-designed controlled trial without randomization.	E	There is good evidence to recommend against the clinical prr
II-2	Evidence obtained from well-designed cohort or case-controlled analytical studies, preferably from more than one centre or research group.	F	There is insufficient evidence to make a recommendation; ho
II-3	Evidence obtained from comparisons between times and places, with or without the intervention. Dramatic results in uncontrolled experiments coul		
III	Opinions of respected authorities, based on clinical experience, descriptive studies or reports of expert committees.		
Grade	Description		

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