Injuries in competitive junior ice-hockey

1437 players followed for one season

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During one season we followed 1437 ice-hockey players, 9–18 years of age, participating in a junior league. We found 128 injuries (9 percent) that caused the player to miss at least one training session or game. One third of the injuries were a result of foul play. The most common types of injury were contusions, sprains, and lacerations. However, fissures and fractures were surprisingly frequent, reflecting foul play with the stick and improper use of the protective equipment. Thanks to the mandatory use of a completely-covering face protector, there were few maxillofacial injuries. The highest yearly incidence of injuries was found in the older players. Prevention of ice hockey injuries is multifactorial, including stricter rule enforcement, improved protective equipment, and better understanding of the forces involved.

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Ice-hockey is one of the most popular team sports in Scandinavia, even among children. It is inherently associated with potential dangers, due to the unyielding boards, rigid goal posts, rubber puck and hard stick, as well as to the hard playing surface (Lorentzon et al. 1988a, Daly et al. 1990). Traditionally, the incidence of injury in ice hockey is thought to be high, and severe trauma, especially to the eye and spine, has been reported (Pashby 1979, Tator et al. 1991). However, epidemiologic studies of the type, mechanism and frequency of injuries, particularly involving the younger age groups, are scanty (Sutherland 1976, Sullivan et al. 1980). We have studied the risk and type of injuries in junior competitive ice hockey and examined the nature and cause of hockey traumas, including the effectiveness of the protective equipment.

Patients and methods

In this prospective study we followed 54 teams, including 1437 players during the season 1990/1991 in an organized junior league in the area of Helsinki. The age of the players was 9–18 years. A questionnaire was sent to every team, coach and player at the end of the fall and the spring seasons. By means of the questionnaire, telephone inquiry and personal examination, we evaluated the type and mechanism of injury, as well as treatment and outcome.

Injury was defined as any injury occurring during ice-practice or games, causing the player to miss at least one training session or game. Injuries requiring special care at an out-patient clinic, hospital or physician's office, were closely examined and analyzed and the medical records of these particular players were reviewed by us. The incidence of injury for the different age groups was evaluated statistically, using the Student's *t*-test.

We also estimated the value of the safety recommendations and rules, as well as the effectiveness of the protective equipment. Finally, we asked the coaches and team officials for their opinion about improvements and suggestions for the prevention of injury.

Results

We found altogether 128 players (9 percent) who were injured; 46 of them were admitted to the out-patient clinic of a hospital, 53 were seen in a physician's office, and 29 were treated at the place of the accident. 682 players younger than 12 years had virtually no injuries. The injuries increased evenly in number from 13 years onward (Table 1).

The majority of the injuries (94 percent) occurred during a game. We found the goalkeepers to be least injured, whereas there was no difference between defence-men and forwards. The most common cause of injury was associated with player contact, such as collision, fall and intentional checking against the boards. The players were also injured by a hit of the

Table 1. The age-distribution of injuries

Age group (yrs)	Number of players	Number of injuries (%)
< 12	682	6 (1)
12–15	534	66 (14)
> 15	221	56 (23)

Table 2. Relation between mechanism and type of injury

Mechanism	Type[a]								Total
	A	B	C	D	E	F	G	H	
Hit by the puck	24	5		1	1		1		32
Hit by the stick	16	12		1					29
Collision	10	8	7		2				27
Checking	5	4	7	1	1		1		19
Violent body checking	3	3				3		2	11
Skating against boards	2		3				1		6
Slipshod training			2						2
Distension during goalkeeper's save			1						1
Fighting				1					1
Total	60	32	20	4	4	3	3	2	128

[a] A contusion; B fracture; C distorsion; D wound; E commotio cerebri levis; F luxation (AC-joint); G dental lesion; H ligamentous injury (knee)

puck or the stick. 32 percent of the injuries were caused by foul play, either by violent use of the stick, forceful checking or simply by fighting.

55 percent of the injuries affected the upper extremity, 19 percent the lower extremity, 13 percent the trunk and inguinal region, and 10 percent the head and face. Half of the injuries were contusions, sprains and lacerations. We found 32 fractures or fissures, mainly in the upper extremity; there were 5 fractures of the clavicle, 14 fractures of the hand, and 11 of the forearm. 1 case of avulsion fracture of the lesser trochanter was a result of sudden deceleration and simultaneous body checking (Table 2). Most of the fractures were caused by slashing with the stick.

Besides the 5 clavicular fractures, there were 3 partial ruptures of the acromioclavicular joint; all the injuries to the shoulder girdle happened in connection with body checking. There were only 2 ligamentous injuries of the knee.

3 of the 10 maxillofacial and head lesions took place in association with collision and falling, and 7 were either due to puck or stick contact. Dental fractures occurred in 3 cases.

The most common suggestion by coaches regarding further preventive measures in junior players was the request for still stricter rule enforcement, e.g., by having a third referee (linesman) in all games.

Discussion

Ice hockey is a violent and potentionally dangerous sport. Young ice hockey players are fascinated by the fast team sport, which involves fitness, skill and, hopefully, controlled aggression. Our findings confirm that early teenagers are the most vulnerable group, with injuries caused by direct trauma (Sim and Chao 1978, Sim et al. 1987, Lorenzon et al. 1988b, Daly et al. 1990). In our study, 32 percent were caused by foul play. However, compared to other popular junior sports, such as soccer and alpine skiing, ice hockey does not seem to be associated with an alarmingly high incidence of injury (Keller et al. 1987, Sandelin 1988, Ekeland et al. 1992).

Eye injuries and maxillofacial lacerations have received much attention during recent years (Sane et al. 1988). The toothless grin of ice hockey players is a well known phenomenon; among professional players two thirds have lost 1 or more teeth (Daly et al. 1990). Fortunately, we saw only 10 head injuries. The use of protective face masks and more vigorous enforcement of rules against the illegal use of the stick, have been associated with a dramatic decrease in incidence of eye, maxillofacial, and dental injuries. In Finland, a completely covering face protection (girdle or plexiglass), became mandatory in junior ice hockey in 1979. However, of the 10 head injuries in our study, 4 were probably partly due to defective face masks. Generally, the prevention of injury is multifactorial (Sim et al. 1987). Supervised practice and physical fitness training will help to prevent injury and also aid in recovery from injury. It is important that coaches, parents and the young players keep in mind that ice hockey is basically a game of skill.

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