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Attitudes towards the use of mouth and face guards in Swedish ice hockey: part 2. Results

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Abstract – *Background/Aim*: The yearly cost of sports injuries, which affects Swedish society, is estimated to 3 billion SEK (460 million USD). Injuries in ice hockey represent at least 270 million SEK (42 million USD). Despite the high number of injuries, mouth and face guards are rarely used in Swedish ice hockey. The major aim of this study was to examine the attitudes of mouth and face guards in two ice hockey clubs in Sweden (one elite and one division 3 club). A second purpose was to determine why some players use mouth and face guards, while others do not. A third goal was to present a material that ice hockey clubs could use for further discussions. *Materials and method*: A phenomenographic analysis of focus groups interviews. *Results*: The phenomenographic analysis of the data resulted in 12 categories. Within each category, issues, activities and engagement of the participants were described. Further, similarities and differences in the discussions between the elite club and the division 3 club were described. The following categories were found to engage the participants the most: 'Ice hockey is a high-velocity collision sport in which injuries are expected', 'Attitudes towards personal protection guards' and 'Suggested measures'. *Conclusions*: The participants were aware of the risk of playing ice hockey, but they know little about the consequences of a dental injury. Although ice hockey players wish to protect themselves, they refuse to accept just any mouth or face guard. Through the discussions about reducing dental and jaw injuries by routine use of protection devices, many reform proposals were presented that could be useful in future discussions.

Despite all the pleasure that sports bring us, participation can, and often do, result in severe injuries. Many of these injuries are costly for society. The total yearly cost of sports injuries in Sweden has been calculated to 3 billion SEK (460 million USD), with ice hockey representing 270 million SEK (42 million USD) (1, 2). Unfortunately, it is not possible to separate the costs of dental and jaw injuries from these other costs, if they are at all included. The amount of societal costs of dental and jaw injuries in ice hockey is therefore still unknown. An inclusion of these costs would increase the above-mentioned costs, especially because it has been shown that every third injury in ice hockey during the period 1986–1990 that was reported to an insurance company affected the head and that every fourth injury was a dental or jaw injury (3). Lifetime dental costs in the USA of avulsed teeth has been estimated at 10 000–15 000 USD per tooth (4). This cost is not too high for an elite ice hockey player with a good salary, but for a player in lower divisions such a cost could be very substantial.

A large number of international studies show that injuries in sports often occur. Echlin et al. reported that 36% of all accidental injuries in the USA were related to sport (5). Studies in the Scandinavian countries have shown a relatively large number of serious sport injuries (10–19%), that is where the athlete was taken to an emergency department for treatment (6). Another study from the USA noted that 19% of all injuries to the head and face and 33% of all dental injuries were sports-related (7). In a German study, 32% of the participants in sports suffered a face or dental injury (8).

In a Swedish study of all accidental injuries during a 1-year period (1989–1990) in the county of Västmanland, 18% of all injuries were of the head, face, teeth or jaws, regardless of age and cause, making the head the third most injured part of the body following the hand and foot (9). The same study demonstrated that sports represented 23% of all dental and jaw injuries in the age interval 7–30 years. Thus, these studies convincingly show that injuries to the head in general and the face and teeth in particular are usual in sports.

Ice hockey is a sport in which the head often suffers from injuries. Rampton et al. (10) observed that every third ice hockey injury among amateurs was a head injury. In the American Hockey League (AHL), 63% of the players had sometime suffered from dental

injuries. Most of these players fractured a dental crown (49%) or avulsed a tooth (20%) (11).

The introduction in Sweden in 1986 of the mandatory use of a face guard (FG) for junior players 20 years of age or younger did not seem to have a greater change in the frequency of dental and jaw injuries. In 1983, 10.9% of all dental injuries in ice hockey that were registered by the insurance company Folksam in the age interval 15–19 years (12) proved to be almost the same percentage (10.7%) in 1990 (3). The results, however, must be interpreted with caution because important information was lacking regarding whether a FG was used at the time of the accidents. Still, the finding of no difference in the number of dental injuries despite the introduction of the mandatory use of a face guard is quite remarkable. A later comparison between reports presented by Folksam from 1985 with those from 1994 and 2002 revealed that the frequency of dental and jaw injuries in ice hockey increased considerably in persons over 20 years of age (3, 12, 13). Every second dental and jaw injury was registered in the age interval 21–25 years (13), and in all three reports, two-thirds of the dental and jaw injuries were registered in the age group 21–30 years (3, 12, 13).

In a study performed in 2002 in collaboration with the Folksam (a Swedish customer-owned insurance company) and the Institution of Health and Society at Linköping University, 5000 dental and jaw injuries in sports were studied from 1994 to 1997 (13). Taking into consideration the time ice hockey players trained or competed, the risk of receiving a dental or a jaw injury in division 4 or lower was three times higher than in the elite division, whereas the injury incidence per 1000 insured players was three time higher for elite and division 2–3 players than for players in division 4 or lower.

The question is whether there is something else than the nature of ice hockey as a tough sport that causes the high risk of injury, or does it depend on some special culture or attitude in ice hockey? Could it depend on the players having a low-risk experience or is there a lack of comfort in wearing a mouth guard (MG) or a FG so players refrain from using them? Is there a different attitude to prevention that leads ice hockey players to accept the risk of being injured? Why do they stop using the FG as a senior player when they have been using it during their 10-year period as a junior player? Could another reason be that referees and players stretch the rules, and as a consequence, increase the risk of injury? The answers to these questions are not simple, probably because players base their attitudes about safety and injury on several factors, which lead to a course of action that we have little or no knowledge about.

Aims

The major aim of this study was to examine the attitudes of one elite and one division 3 Swedish ice hockey club towards the use of mouth and face guards. The second goal was to determine why some players use mouth and face guards while others do not. The third aim was to present material that ice hockey clubs could use for further discussions.

Materials and methods

A phenomenographic approach is adapted in this investigation to explore the use and attitudes of mouth and face guards in two Swedish ice hockey clubs. The method is frequently employed in educational research in which the process of learning is in focus (14). A detailed description of the approach and the materials and method has been presented previously (15). In the result section, the elite ice hockey club was referred to as 'elite' and the division 3 club as 'division 3'.

Ethical approval

The study was approved by the Ethic and Science Committee in Linköping, Sweden.

Results

A phenomenographic analysis resulted in 12 distinct categories. Within each category, issues, varying activi-

Table 1. Activity and engagement by category and club level. Underlined focus group means that the participants were exceptionally engaged in that category

Category	Elite	Division 3
1. Ice hockey is a high-velocity collision sport in which injuries are expected	All focus groups	All focus groups
2. The extent of dental and jaw injuries is unknown	Club management All players Parents Referees	Club management All players Parents Referees
3. Their experiences of dental injuries and the experiences of others	Juniors Seniors	Juniors Seniors
4. How effective is a mouth guard?	Club management Seniors	–
5. A new type of Plexiglas may cause head injuries	All focus groups	All focus groups
6. Media presents a picture that success in ice hockey includes taking risks and accepting injury as a part of playing sports	Club management	Club management
7. The referee has responsibility for control of players' behaviour during competition and implementing the rules of the game	Referees Seniors	Referees Parents
8. Attitudes towards personal protection guards	All focus groups	All focus groups
9. What do the participants believe about the attitudes of the other focus groups?	Club management Juniors Other focus groups	Club management Juniors Other focus groups
10. The elite club wished that their young players early focused entirely on ice hockey	Club management Parents	–
11. Knowledge of what is included in sports insurance is insufficient	Club management Parents	Club management Parents Seniors
12. Suggested measures	Club management Seniors Referees	All focus groups

ties and the engagement of the participants were described at length (Table 1). Moreover, similarities and differences in the discussions between the elite and division 3 clubs were described (Table 2). The categories that the participants were engaged in the most were 'Ice hockey is a high-velocity collision sport in which injuries are expected', 'Attitudes towards personal protection guards' and 'Suggested measures'.

1. Ice hockey is a high-velocity collision sport in which injuries are expected!

The participants took up the following questions: attitudes towards protection guards, responsibility and in which way ice hockey has changed today and will change in the future. The question, in which way violence in the society is reflected in sports, was not prepared in the question guide.

Quotations:

> Elite: Yea, a little because I am working with it, so to say in my civilian life and I feel it is some kind of a development of the society in some way and this tougher development is brought with the players when they enter the ice hockey rink. One doesn't hesitate to perform these aggressive acts. Of course, this occurred earlier as well, and I am totally convinced about that. Earlier there was less debating about it and really no writing about it and probably there were fewer injuries, too. I have a feeling that it has escalated more and more and I… I say it again, it could be the speed, the speed has increased so much that the players can't really control it, at least in certain situations, so to say.

> Elite: …And then you can think of, which I find absolutely the most important, the attitude toward one and another out there on the ice today? I think the respect we show for each other has decreased during the past years. I mean I don't think they … it is like how people behave in our society today. I don't think the players have the same respect for each other that they once had. It is like there are fewer cases of real body checking, which is less dangerous for the players. Instead, the players use the stick, elbows and other things. I have the feeling that today's game has become more careless.

> Division 3: I believe it is…a harder attitude. If you watch a 10-year-old boys' team of today and compare it to when I was younger, you respected the older players. One wouldn't dare to be cocky and yell at an A-team player. Today, if you pass a dressing room with 10-year old boys, you will be able to hear both this and that. Some kind of an attitude, I believe. I do not know why it has become so.

2. The extent of dental and jaw injuries is unknown

The participants raised the following questions: what are the risks of face injuries and in what way has ice hockey changed? Factors that affect the frequency of injury were not prepared in the question guide, but were taken up spontaneously by the participants.

3. Their experiences of dental injuries and the experiences of others

The participants took up the question about their experiences and the experiences of others with respect to dental and jaw injuries.

Quotations:

> Elite: I have two fractured front teeth, both up in the root and in the front.

> Elite: Got a club in my face earlier this year. Both my front teeth were avulsed, half of them. … I have never had any caries in my teeth and every time I visited the dentist he praised my teeth, so it was sad. Now I do not have any front teeth any more. No, this could have been avoided. I didn't use any mouth guard.

> Division 3: I have avulsed teeth, fractured three teeth and then three more. The dentist is doing some sense testing to check if I will loos them or not. So, it is six teeth in total, which are injured on three separate occasions.

> Division 3: I have five injured teeth with all occurring at the same event.

4. How effective is a MG?

The participants pursued the following questions: attitudes towards protection guards in general and dental and jaw guards in particular. The question about costs of a MG was not prepared in the question guide but was taken up by the participants during the interviews.

Quotations:

> Elite: … if you receive a blow at the areas of the mouth and teeth when using a mouth guard, isn't there a risk to intrude everything? … I believe there is a greater risk. I have been thinking about this several times, really. Earlier a blow to one tooth causes only that tooth to fracture. If you use a MG, not only is that tooth injured but also a couple of other teeth close by because the energy from the blow is distributed to the surrounding teeth.

> Division 3: … One would like to know how much this little piece of plastic does to protect from a blow. … The cost is 70 SEK (10 USD) or something, you bite it, but it wouldn't help or…? But if you really know that it helps, then you would buy it. I believe we know too little. Does a MG really help?

5. A new type of Plexiglas may cause head injuries

Questions pertaining to new materials around the rink that may cause head injuries were not prepared in the question guide. The participants themselves raised these questions.

Quotation:

> Division 3: Ok, sure, the Plexiglas is hard as stone. Earlier, when there were bars behind the Plexiglas, it was more

Table 2. Number of categories that includes comparable findings from both elite and division 3 clubs and findings distinctive to each club level

Categories	Clubs	Results
1. Ice hockey is a high-velocity collision sport in which injuries are expected	Both clubs	The game of ice hockey today (season 2001/2002) is faster, and players are characterized by speed, size, strength and high skill. In addition, players are apparently more aggressive and the game could be regarded as a high-velocity collision sport in which there is a high probability of injuries
	Elite	A rather violent and brutal society has led to younger players showing a lack of respect for each other. In 10 years, elite players have become as strong and fast as players in the NHL, which may lead to more exciting and entertaining ice hockey matches. Serious injuries will seldom appear and popularity in ice hockey has grown dramatically. Increased speed and skills may result in improved ice hockey performance, but at some risk of losing precision
	Division 3	Sports are important in the development of our society, but the more toughened attitude of society is mirrored in today's sports. Some players deliberately injure other players, which should be regarded as a criminal act and lead to legal ramifications. Young players have begun to be more assertive and even show less respect towards older players. Rules and regulations are not implemented from club management to the players and parents do not stand up to club management. Development in ice hockey is inevitable (e.g. players will be faster, stronger and more explosive). In 10 years, ice hockey has become tougher and the playmakers have become fewer. Instead of an increase in speed and technique, extremely aggressive and bad behaviour has increased. Stronger and faster players may result in a much tougher ice hockey. Players who receive less injuries (favourite) could be the result of increased fair play
2. The extent of dental and jaw injuries is unknown	Both clubs	Information about the extent and cause of dental and jaw injuries and the use of mouth guards (MG) are desirable. Junior players underestimate the risk of injury and have a low sense of security compared with seniors, which is probably because they have been using a face guard (FG) throughout their junior career
	Elite	There has been an increase in body checking after the age of 15 years, which could lead to serious injuries. Compulsory use of a FG during a player's junior years and the use of a MG during a player's senior years must have resulted in a dramatic reduction in dental and face injuries the club management believed
	Division 3	The risk of injuries when body checking at a young age is strongly associated with body size. Lower divisions usually play 'ugly hockey', whereas play tends to be 'cleaner' in the higher divisions. Lack of knowledge of the seriousness of a dental injury could lead to poor motivation to seek treatment
3. Their experiences of dental injuries and the experiences of others	Both clubs	Experiences of both complicated and less complicated dental injuries[1]
	Elite	–
	Division 3	No discussions about the risk of dental injuries. A brief interest is shown when a dental injury occurs but it soon fades with time
4. How effective is a mouthguard?	Both clubs	–
	Elite	Elite management and players question the effectiveness of a MG as a preventive device. A rumour purports that a MG could contribute to the injury of several teeth during a single trauma event
	Division 3	A semi-product MG does not protect the player from hard blows to the face and teeth
5. A new type of Plexiglas may cause head injuries	Both clubs	–
	Elite	Sharp edges around the rink side, the Plexiglas panels that sit atop the boards and box doors all may cause injuries
	Division 3	The new Plexiglas is too rigid and thus could lead to serious brain or head injuries. Players use this new Plexiglas with the purpose of dazing or even injuring the opponent
6. Media presents a picture that success in ice hockey includes taking risks and accepting injury as a part of playing sports	Both clubs	According to the media, to be successful in ice hockey you must be willing to take risks and get injured
	Elite	The perpetrators get the attention they look for if hockey violence (fighting and dirty play) is shown in the media. A tough attitude on the ice as advocated by commentators in the media can filter down into society
	Division 3	Young athletes can form an inaccurate picture about sports if hockey hits and fights are shown on television
7. The referee has responsibility for control of players' behaviour during competition and implementing the rules of the game.	Both clubs	A referee is an extremely important element of the game for he has responsibility for control of the players' behaviour during completion and implementing the rules of the game. On occasion, a referee forgets his responsibility under very intense and hectic conditions
	Elite	Rules and regulations are clear about responsibility and consequences when these rules or regulations are broken, but it is still difficult to control chronic offenders. A faster play has made the game very difficult to referee. Contact between trainers/leaders and referees have deteriorated, probably because of certain situations that are caused by the commercialization of sports. It is difficult to recruit new, young referees who may find it difficult to interfere in the game and send players in their own age to the penalty box. Swedish referees still experience a good deal of scorn and ridicule, as well as a lack of status

Table 2. Continued

Categories	Clubs	Results
	Division 3	Rules and regulations are difficult to comprehend and only a small number of the referees know all the rules and regulations. A referee's most important task is to prevent the game from getting out of control. By employing functional dialogue, a skilled referee can create good contact between the players, trainers/leaders and himself. The referee should listen to the young players and explain their decisions, which is what the elite referees do. The acquisition of elite referees is good, but acquiring referees in the in lower divisions is difficult. A decrease in the quality of refereeing, which is due to the difficulty to engage new referees, could lead to an increase in player injuries. In comparison with referees in the NHL, Swedish referees suffer from low status and poor image
8. Attitudes towards personal protection guards	Both clubs	Senior players do not use a FG. However, players who have been recently injured may use a FG without being harassed. Players with a visor are more cognisant of risks than players using a FG. The use of a FG decreases the player's brave and tough image
	Elite	Protection devices must not prevent the player's flexibility, concentration or contribute to dangerous play. A senior player does not use a FG, and thus, any legislation for the mandatory use of it will most likely meet rigid resistance. In Canada, level of division, and not the age of the player, determines which type of protection guard is used or whether it is mandatory or not
	Division 3	Protection guards are worth the cost if they help protect the player from injury. Wearing a FG involves being taunted and harassed by some players, but older players seem to accept wearing a FG because they do not feel the need to show they are tough and unafraid of injury. A change from a FG to a visor is a symbolic act. The poorer the player is, the less likely it is he will buy a new protection guard
Advantages with mouth and face guards	Both clubs	–
	Elite	A FG covers both the mouth and face. When the compulsory period of using a FG is terminated, a MG must replace it. A thin and soft MG is well accepted by most players. The visor helps against strikes to the face.
	Division 3	During close contacts, a FG protects the face better than a visor and offers better visibility. There is no reason to stop using a FG after the junior career is over. A visor looks 'cooler', does not obstruct the game and may protect the eyes. Legislation that enforces the use of a MG would be possible because player and management's understanding of its benefit has increased in recent years.
Disadvantages with mouth and face guards	Both clubs	–
	Elite	Dental and jaw injuries may happen, even though a player uses a FG. Some disadvantages of a FG are that it disturbs the player, makes him feel shut-in, uncomfortable, feeling like a 'junior' and like a 'dork'. A bulky MG is difficult to accept because of its large size, clumsiness and that it disturbs breathing. A prefabricated MG is difficult to use and a MG made by a dentist is too expensive. A visor does not prevent jaw injuries. Alternatives to FGs and MGs should be developed.
	Division 3	A FG makes you feel like a nerd is uncomfortable and may result in feelings of claustrophobia. The advantages of a FG are too few to continue using it. It would be difficult to increase the use of a FG. The risk of being injured is high with a visor and it does not protect from dental and jaw injuries. The sight through a visor worsens in time because of natural age and scratches.
9. What do the participants believe about the attitudes of the other focus groups?	Both clubs	Parents were correct in their argument that senior players do not wish to continue with a FG after the mandatory period expires. Senior and junior players made it very clear in their decision to no longer use a FG (and hence increase the risk for injuries). Players were correct in their assessment that their parents (both mothers and fathers) wanted them to continue using a FG. Players also correctly assessed that their fathers accepted the risk of injury more than their mothers
	Elite	Elite management were correct in their assessment that junior players ignored the risk of being injured and instead were prepared to accept the possibility of dental injuries
	Division 3	Club management correctly confirmed that youth players believed it is tough to be without teeth and play ice hockey. Club management and youth players were correct in their belief that junior players would stop using the FG as soon as it was legally possible
10. The elite club wished that their young players, even at an early age, focused entirely on ice hockey	Both clubs	–
	Elite	The club make serious investments in their youth players and therefore ask them to stop training in other sports at an early age. Parents seem to appreciate this information. Youth players often play in higher divisions to compete against tougher competition, which could result in injuries. Players should be good examples on how to behave when representing the elite club. The elite club felt it was important to discuss ethical and moral issues more than clubs outside the elite division. All sports include risks, irrespective of division
	Division 3	–

Table 2. Continued

Categories	Clubs	Results
11. Knowledge of what is included in sports insurance is insufficient	Both clubs	There are deficiencies in the composition of sport insurance policies
	Elite	The excess in sports insurance is high. Group insurances in sports from the age of 16 years and over are lacking and supplementary insurances do not include dental injuries. Parents and players believe that 'someone else pays the costs of a dental trauma' (such as the county council) for players up to the age of 19 years. Players in lower divisions are poorly insured
	Division 3	Sport insurances outside the elite division are not sufficient and thus supplementary insurance is needed. Players wish to know what is included in sports insurance and how much they must pay themselves in case of a dental injury
12. Responsibility and cooperation	Both clubs	Everybody has a responsibility to protect against injuries. The basis to reduce injuries and their consequences is that some institution (e.g. insurance companies) shows a change in injury incidence. The media has an important role in how ice hockey is presented to the public
	Elite	Parents of players have a responsibility to keep track of their local club activities. A databank that includes all ice hockey injuries should be established and an international study of all ice hockey injuries is suggested. The referees should be required to report severe offences to an independent board. The board should have available information (e.g. videos) to determine the degree of intention. If there is no video recording, similar cases from the past could be used as a reference to impose a sentence. Trainee referee courses should be performed in which players are trained in interpreting the rules and regulations. Rules are ignored first among elite players and later among lower divisions. If a player via the media expresses his willingness to always use a MG, such an attitude could have an enormous impact on young players
	Division 3	Responsibility is often lacking after an ice hockey accident. Insurance companies and ice hockey clubs should cooperate to arrange for lower costs of a MG. A reduction in injury costs owing to the club's own preventive initiatives should be used to benefit their local youth ice hockey players
Information and education	Both clubs	All players should continually be educated in matters of dental and jaw injuries and their characteristics. Awareness of the detrimental consequences of severe injuries should be well established before they happen. Players younger than 15 years of age should be educated in how to give and take a body check properly, as well as how to act to avoid a fight. Ethics and morals should be developed with parents and leaders serving as models of good moral behaviour
	Elite	All clubs have a responsibility to supply news at local meetings and ensure that suggested measures are performed. The dentist who is responsible must ensure that the player uses his MG
	Division 3	Every club is responsible for the education of players using the material developed and implemented by the Swedish Ice Hockey Association. The Swedish Ice Hockey Association, in cooperation with the clubs, should see to that each player, especially those in the lower divisions, are adequately insured. Trainee referee courses ought to be mandatory for all players in order to see the game from the perspective of the referee. Like referees, the players must learn and follow the rules and regulations of the game. Every player has a responsibility to use compulsory prevention guards. Every player should be personally and socially competent outside the rink
Preventive work	Both clubs	When there is a shift from a FG to a visor, the hope is that this would result in the use of a MG to avoid serious dental injuries
	Elite	The mandatory use of a FG is probably the best optional preventive measure available today. Implementation of a FG should preferably be based on an international rule from the IIHF (International Ice Hockey Federation), or a European rule. Another way could be a limited use of a FG whereby the use of it is not mandatory after the age of 16 years. A third way could be the mandatory use of a FG in division 2 or lower because of a greater acceptance among older players in these divisions. The club should provide some form of economic support so that all players can buy a MG and at the same time supervise its use. Sweden should take part in the on-going ice hockey campaign 'Fair Play and Respect'
	Division 3	A change in the regulation regarding the use of protection guards should be an international concern, although the Swedish Ice Hockey Association may make a separate decision on the compulsory use of dental and face protection guards in national games. The Swedish Ice Hockey Association should initiate the use of protection guards. A shift in generations could be another way to enforce use of a dental or face guard. A MG should be marketed in the same manner as other prevention devices in ice hockey. Before a player insurance policy is legally acceptable, the insurance company should initiate the obligatory use of protection devices
More effective and attractive mouth and face guards should be developed	Both clubs	–
	Elite	Dental and face guards need to be developed that are more adaptable and ergonomic. Other materials connected to the ice hockey game (e.g. the Plexiglas, doors) should continuously be improved
	Division 3	–

[1]The classification of uncomplicated and complicated dental injuries is based on an increased risk of complications when the pulp has been exposed by fracture or the periodontal ligament has been injured by dislocation of the tooth (38).

resilient. Today, it is like skating into a wall. Look when they're body checking a player into the Plexiglas with an elbow right into the head or face. It is much more serious today and may cause brain damage or jaw injuries when a player's head is body checked against the hard surface.

6. Media presents a picture that success in ice hockey includes taking risks and accepting injury as a part of playing sports

Questions about media were not present in the question guide. The participants themselves raised these questions. The importance of media and the attitude of violence in society were discussed.

Quotations:

Elite: … and I don't like media's way of presenting. Why in the elite final game take a photo when a player is completely messy with blood in his mouth. What is the message? Is it that you can play ice hockey with all of your teeth knocked out and in the same match? It is like, it is a quite distorted picture, or…?

Elite: Media … a giant influence in everything, everything. People who are in possession of that baton do not comprehend the strength of their signals. Commentators recommending tougher play and prefer players smashing into each other help legalise violent play. It would be better if the media instead co-operate with Swedish Ice Hockey Association in a joint effort to reduce violence.

7. The referee has responsibility for control of players' behaviour during competition and implementing the rules of the game

The participants themselves raised questions about responsibility and whether a referee could be more lenient in certain situations. Although not a question in the question guide, the participants questioned why certain referees ended their career earlier than planned.

8. Attitudes towards personal protection guards

The participants themselves addressed questions regarding attitudes towards different protective guards and how to use them, a player's image, in which way the game has changed and the use of different kinds of protective guards. Costs of protection guards were also discussed.

Quotations:

Division 3: … now I will not be called a bloody junior anymore because now I have become a senior player and they do not have a FG!

Advantages with mouth and face guards

Quotation:

Division 3: I think about reducing the risk of an accident. If you have a FG, you can't injure either eyes or teeth. There is a risk of playing with high sticks when the players use a FG. This is the referee's problem to deal with. I don't think you should expect losing your teeth only because you are playing ice hockey when there are protection guards.

Division 3: The junior generation I am training has grown up with FGs during their whole training period, so it wouldn't be any problem for them to reach senior age and continue with their FG, absolutely not. Maybe it's a tradition, I don't know. I don't think they have any problems with fitness, seeing or anything else. I don't know what it is …why they refuse to wear the FG I do not have any good answer to that because I don't think a FG doesn't hinder them from playing ice hockey I don't believe that it can do this.

Disadvantages with mouth and face guards

Quotation:

Division 3: There is no player who really has a FG adjusted as it should be, and this is dangerous because you could get a blow from underneath and then another blow at the front of the FG, which could result in serious damage to your teeth, mainly because you have nothing to protect your teeth. The leaders must check this!

9. What do the participants believe about the attitudes of the other focus groups?

The participants discussed what they believed were the attitudes of the other focus groups. Participants also raised questions concerning risk of injuries, attitudes towards prevention guards and a player's image. In addition, ice hockey idols were discussed. In this category, the costs of a MG were also discussed.

Quotation:

Elite: I believe it is something they accept. I believe that many of them, absolutely my players, believe it is something to expect when they leave their FG. Ok, ok but I don't know, but it is something they prepare for… it is like nobody wished it, but they don't really care about it.

10. The elite club wished that their young players, even at an early age, focused entirely on ice hockey

The participants themselves raised the question about policy in the elite ice hockey club, which was lacking in the question guide.

11. Knowledge of what is included in sports insurance is insufficient

The participants took up the question about sports insurance, which was not a question appearing in the question guide.

12. Suggested measures

The participants raised questions about the risk of being injured, a players image, responsibility, future

changes in ice hockey and suggested measures to reduce injuries. The participants also raised questions about attitudes towards violence in sports and society, which were not prepared in the question guide.

Responsibility and cooperation

Quotations:

> Division 3: It has become…if you look at lower divisions it is a responsibility of trainers/leaders and parents, it is about how to bring up players. Teach what is correct and incorrect. As a trainer, you can have significant influence on the young ones. This could be done also in our ages, but it is much more difficult to influence us 'old men'… to change our way in how we play. It doesn't need to be so that players become injured, but it could affect the team in a negative way. Yet, it is still so that we adults have to take our responsibility. We have to use our roles as leaders, build up the responsibility of all young players until they reach adulthood. Then you also have to take care of it by yourself, but of course as you say, trainer is responsible for removing players who play dirty or too rough; he must also teach them how to behave on and off the ice. But in the end, it is the player's own responsibility to behave correctly.

> Elite: … as an insurance company, you have catastrophically failed to specifically inform the ice hockey clubs about injury patterns and their consequences. Yes, about the injuries, how many and their severity; what kinds of injuries… And it is also about what caused the injury. This might help us to understand whether it was recklessness or not. Then important persons in ice hockey would probably react. And this should not primarily be the general manager in the Swedish Ice Hockey Association, but rather those persons in the club with responsibility for training young players. They have the important responsibility in the training. You have to contribute!

> Elite: The youth players always run around in the arena. Suddenly, some of them could acquire bad habits from an A-team player such as furiously running the hockey stick into rink side. I believe this could happen. It is easy to copy bad habits.

Information and education

Quotation:

> Elite: But first of all, you only speak about an accident when it has happened. Talk about prevention must begin much earlier before the accident has happened. Somebody has to see to this. One has to get people involved at an early stage. Let's talk about…, to have somebody killed in a car accident and then look for the safety in the car. I mean that is not how people making cars do. They are continuingly looking for how to reduce or prevent car-related injuries. And that is what we should do, too, in a much better way than today and continuously look for better solutions.

Preventive work

More effective and attractive mouth and face guards should be developed.

Discussion

The most important and concordant apprehensions in both the elite and division 3 clubs were that ice hockey is a high-velocity collision sport in which dental and jaw injuries are expected and that the drive to win, increases in demand and tougher development of our society are mirrored in sports at all levels. After the time as a junior, a FG is no longer used, but a MG could be accepted if the player receives sufficient information about the costs of manufacturing a MG and whether they really protect the teeth from being injured. Presently, MGs are considered clumsy and therefore difficult and uncomfortable to use. In division 3, older players are much more willing than younger players to accept a FG, probably because they feel less prestige in playing ice hockey compared with younger players.

A limitation of this study is that it was initiated 2002, which could be regarded as a rather long time ago relative to the relevance of the results. However, the fact that the same problems in Swedish ice hockey discussed 10 years ago is still discussed today and that the results of the study could be compared 10 years later indicate good validation. Another limitation is that the present result cannot be regarded as valid for all ice hockey clubs in Sweden because only two clubs were included. In spite of this limitation, some of the questions and discussions presented in this study probably are found in other Swedish ice hockey clubs, too.

The participants' proposal of measures to reduce injuries, shown in Table 3, covers a broad spectrum of areas of study that includes cooperation, responsibility, information, education, ethical and moral behaviour, the use of FGs and MGs and their development. These extensive data could be used for further research in which a larger number of ice hockey clubs or other sport clubs participate.

In the first category, '*Ice hockey is a high-velocity collision sport in which injuries are expected*', both clubs assumed that ice hockey is a sport in which injuries are commonplace (and sometimes intentional). Because an elite ice hockey club can be seen as a workplace, the question is whether potential players should be informed by their employer of the inherent risks involved in playing ice hockey. If so, a safety representative should immediately question the circumstances in such a workplace. It may be that ice hockey clubs in lower divisions are not to be regarded as working places in the same way as elite clubs. Rather, this type of recreational activity should probably be questioned if it is so risky that the player needs to consider head and dental injuries as a serious threat. In this case, an insurance company would likely question this kind of activity.

In this first category, elite ice hockey players said that faster and stronger players in the future should not have any significant influence on the development of serious injuries, whereas division 3 are more careful in their judgement and suggest that ice hockey could be harder in the future. The different opinions between the two clubs may be due to their different prerequisites in training and technique. A worrying sign in rela-

Table 3. Issues suitable to initiate continuing discussions in the prevention of dental and jaw injuries in different divisions in ice hockey

Local level (the club only)	
Injuries	Questions: What are the reasons for not using a mouth guard (MG) after having received a dental injury? In which way can a person with experiences of a dental injury be of importance in reducing dental injuries?
Media	Question: In which way do the media present a picture that success in ice hockey implies taking risks and getting injured?
Referees	Questions: How can we improve contact between leaders/trainers and referees to avoid stressful situations? How can we change players from having unreasonable demands on the referees?
Education	Suggestion: At an early stage, parents and leaders should inform the players about the risk of being injured and why protection guards are necessary. There should also be continuing discussions about the potential penalties of not following the rules and regulations of the game
Regional level (a number of closely related clubs)	
Injury risk	Questions Should ice hockey mothers accept their husbands' view that injuries are inevitable and thus must be accepted as part of the game? Should junior players accept that senior players expect them to ignore the increased risk of injuries when the compulsory period of using a face guard (FG) has expired? Have the players become stronger, quicker and more skilled today than 10 years ago when this study was initiated? How do we motivate players in division 3 to invest in more expensive and better protection guards?
Attitudes	Questions: How can we best use the information that older players in division 3 would accept a FG? Should parents accept that *not* using the FG after the junior period has ended is simply a question of attitude? In which way is it possible to influence young male players (i.e. junior players) to continue using the FG as senior players? How should this be carried out practically?
Referees	Questions: Why do persons (management and players) in elite hockey regard the rules and regulations as being comprehendible, whereas management and players in division 3 experience them as difficult to read and understand? Why is it difficult to recruit new and young referees in the lower divisions? What do we need to do to improve this situation? How could we improve referee conditions in the lower divisions to improve the overall quality of referees? How can we solve the problems that young referees often experience, such as a lack of support from adults in how to deal with players of the same age as themselves? What are the factors that prevent young male players from discussing a referee's decision? Suggestion: Young players should participate in annual trainee courses for referees in order to learn how to interpret the rules and regulations
Co-operation in education	Suggestion: Every club should be continuously reminded of its responsibility to present information from local meetings. They should also present actions to reduce dental and face injuries and control the success of these actions.
National level (The Swedish Ice Hockey Association and associated parties)	
Attitudes	Questions: Is ice hockey a high-velocity collision sport in which dental and jaw injuries are expected? Are there situations where a player intentionally injures another player? Are some players even prompted by their coaches to injury an opponent, especially a star opponent? In which way could intentional injuries harm Swedish ice hockey? Are younger players arrogant and over-confident? Does a sport influence today's society (or is it the opposite)? Under what circumstances should a referee be permitted to bend or stretch the rules? What are the consequences of such behaviour?
Media	Questions: In which way does violence in ice hockey get attention in the media (which is often the goal of the perpetrators)? When are media commentators allowed to demand tougher behaviour in Swedish ice hockey? Suggestion: Because the media has an important role in the presentation of ice hockey, cooperation between the media and the Swedish Ice Hockey Association is extremely important. The media and the Swedish ice hockey Association should collaborate to ensure the safety of the players
Regulation	Questions: Should body checking remain prohibited until the player is 15 years old? How should a disciplinary board deal with chronic violators of the rules? Why is the division level (as in Canada) the determining factor for the type of protection guards used rather than the age of the player as in Sweden? Suggestions: Severe or gross misconduct must be reported to an independent board, where examination of video records (or other material) determines the degree of intention. If no video recording of the game is available, the board should use comparable cases as a basis to impose a sentence. A face protection reform would probably be easier to initiate in division 2 or lower divisions. Another possibility would be to wait for a change in generation among junior players where it would be natural to continue with their FG. MG use should be recommended immediately after the FG compulsory period has expired. Clubs should offer economic aid to buy a MG and make sure the equipment is working properly. The insurance companies should include certain demands that special protection guards must be used in order for the contractual obligation to be fulfilled
Equipment	Suggestion: A MG should be marketed in the same way as other protection guards

Table 3. Continued

Sport insurance	Questions: What could team management in both clubs do to increase knowledge about sport insurances? Why do the dental insurance policies in elite and division 3 differ? Suggestions: The Swedish Ice Hockey Association should ensure that players in the lower divisions are provided with good sports insurance similar to that offered elite players. A reduction in club costs because of a decrease in dental and jaw injuries would preferably benefit the younger athletes.
Education	Questions: Who and how should we educate players about dental and jaw injuries, including the character and consequences of such injuries? The education must create an awareness of injuries before they occur? What could the insurance companies do to increase knowledge about their sport insurances? How could we increase the referee's status in Sweden? Suggestions: Parents have a responsibility to follow the activity in their ice hockey club. All insurance companies and other institutions involved in the sport should see to that every ice hockey injury is registered in a databank, including cause, mechanism and trend. They should also study the effects and use of a MG or FG and follow-up different preventive implementations. The information in this databank should be communicated to the clubs and parents on a regular basis. A comparative study on dental and jaw injuries that includes data from Sweden, Finland and the NHL is suggested. Players 15 years old or younger should be educated in the art of body checking and on how to avoid getting injured from such contact
International level (International Ice Hockey Federation and the NHL)	
Safety	Question: How to increase safety in international ice hockey? Suggestions: The International Ice Hockey Federation (IIHF), the Swedish Ice Hockey Association, insurance companies and dental care providers should make a joint effort towards reducing dental and jaw injuries in ice hockey. Mandatory use of a FG should be a policy decree from the IIHF but also from the European ice hockey and the NHL. A special work should be composed concerning the attitudes among all participants in ice hockey, with special attention given to ethics and moral practice. The MG and FG that exist today need to be improved, including better functioning, design and ergonomics

tion to this category is that both clubs expressed concern about the tougher development of our society and how this seems to be reflected in sports. Elite players expressed concern about the media demanding a tougher game through their commentators: 'They do not know the strength of their signals'. Both clubs in this study wished their players to be good advocators of ice hockey.

In the second category, '*The extent of dental and jaw injuries is unknown*', elite players noted correctly that dental injuries are common in ice hockey and that the first few years after the mandatory use of a FG are overrepresented concerning dental injuries. Division 3 players judged the risk of dental injuries to be lower, although they felt the game is harder in the lower divisions. Because the participants in division 3 did not know the extent of treatment of a dental injury, their motivation to use a protection guard is likely to be low. In this case, the insurance company and the dental health provider have an important mission to inform players about the consequences of a dental injury.

In the third category, '*Their experiences of dental injuries and the experiences of others*', players who suffered from a dental injury discussed their experiences with other players. These kinds of personal experiences should be used more in situations where the consequences of a dental injury are discussed.

In the fourth category, the participants asked the question, '*How effective is a MG?*' There is no short and simple answer to this question in that we cannot know for certain that a MG allows complete protection against dental injuries. Furthermore, we do not even know which type of custom-made MG that is better than others because of a lack of studies on human subjects. A randomized controlled trial (RCT) is the preferred research design, but it would be unethical to perform such a study on human beings. Studies today that offer an acceptable study design and statistical analysis show that the use of a MG results in less dental injuries (16, 17). There are several studies, however, reporting a lack of a significant difference in dental injuries between individuals who use a MG and those who do not (18, 19). Custom-made and professionally adjusted boil-and-bite guards have been shown to reduce the risk of dental injuries (20).

Another question was whether MGs could have undesirable effects, such as the injury of more teeth than expected. *In vitro* studies on sheep cadaver have shown that custom-made MGs increased the mobility on the protected teeth, but also contributed to adjacent teeth being injured because of distribution of forces to the adjacent teeth (21).

It is not unusual today to see players easily remove their MG from the teeth and temporarily keep it, for example in their glove. Easy removal of the MG is because some players perform their own adjustments by using scissors or a knife to make the MG more comfortable and easier to handle. When the dentist observes this behaviour, he should explain that such an adjustment lowers the MG's ability to protect the teeth from injuries. A well-made and well-adjusted MG should not be able to be removed from the teeth without considerable effort. Johnston and Messer showed that if the MG is well adjusted and extended all the way up to the labial sulcus, both the teeth and the jaw bone are protected from potential fractures (21).

Another category that was spontaneously presented by the participants was '*A new type of Plexiglas may cause head injuries*'. The participants raised this point because of a new type of Plexiglas, which the players experienced as too rigid and thus collisions with the Plexiglas walls could cause various injuries including head injuries. Some of the participants feared that players could be inclined to use this circumstance when body checking.

The next category the participants themselves took up was '*Media presents a picture that success in ice hockey includes taking risks and accepting injury as a part of playing sports*'. The management of both elite and division 3 clubs reported that media presents a picture that success in ice hockey consists of taking risks and being injured and that the media more often focus on the achievements of injured players than on the achievements of noninjured players. Elite management questioned those commentators who predict a tougher attitude in ice hockey. Elite management assume this behaviour could extend to society. It seems that most persons in ice hockey felt that the media and ice hockey should cooperate to reduce the amount of violence.

The phenomenon that it is tough not to use a mouth or a face guard has been studied. The result was that, except for FGs, even MGs were regarded by many players as a sign of weakness, that is as lacking physical or mental strength. In 1998, professional ice hockey players were asked to test the MG free of charge, but they refused to do so (22). The players' opinions changed after they were informed by the researchers (dentists) about the risks of dental injury.

Neussl asked the question 'Do you feel that being without teeth is a correct portrait of an ice hockey player?' Thirty-nine percentage of the ice hockey players in Neussl's study stated that it was a correct portrait and 61% said that it was not (11). Although the majority of the players responded in the negative, nearly 40% see it as a natural effect of participating in the sport. This latter view was confirmed in this study.

In the category '*The referee has responsibility for control of players' behaviour during competition and implementing the rules of the game*', the participants emphasized that a referee must at all times be in control, follow the rules and not to be influenced by outside factors such as the fans or the importance of the game. Despite these expectations, the participants realized that because the game is faster and the players are stronger, quicker and more skilled, the task of a referee has become more difficult. One problem was that referees in division 3 felt that the regulations were hard to read and understand. On the other hand, the referees in the elite division thought the regulations were easy to understand and apply. One could wonder in what way this could jeopardize the recruitment of new referees, which mostly begins in lower divisions?

Another category, which engaged the participations to a great extent, especially the division 3 players, was '*Attitudes towards personal protection guards*'. This is because MGs are expensive and the players often have to make a choice as to whether to invest in a new and better MG or continue to use the old one. To change a worn out MG on a regular basis is hardly a matter of choice, especially as players have got used to their MGs, by making them soft and comfortable to use.

Several of the participants in this study and in other studies as well reported a MG causes difficulties in breathing (23–25). Berry et al. showed that, despite that 82% of the ice hockey players used a custom-made MGs, 64% experienced them as unwieldy, 75% as uncomfortable, 73% complained of breathing difficult and 85% felt they influenced speech (23). The authors concluded that, although 73% of the players felt that the MG made it difficult or very difficult to breath, only 37% felt it affected the game negatively. Seventy-five percentage of the participants believed the MG should be mandatory. Francis and Brasher tested the breathing capacity and ventilation of carbon dioxide in a stock type MG bought in a store (26). Seventeen healthy and nonsmoking individuals between 20 and 36 years of age experienced reduced breathing capacity using the stock type MG when light loaded compared with without using the MG. At high loads, breathing capacity was somewhat increased. The reason may have been due to pursed-lip breathing (PLB), which is used by patients who suffer from chronic and obstructive lung disease (COPD). In COPD, breathing frequency is reduced and the amount of air increases for each every breath. The change to PLB could be comparable with breathing using a MG.

Bourdin et al. (27) studied whether the use of a MG (i) lowered the player's attention, concentration and focus on the game, (ii) influenced the air stream while resting compared with at load and (iii) affected the player's explosiveness and strength. Both boil-and-bite and custom-made MGs were made under the supervision of a dentist. Twenty-seven active athletes, including one ice hockey player, showed no significant changes, either between the two types of MG or the normal situation without any MG. Those differences Francis and Brasher reported in their study could be that they used only a stock type MG (26). Bourdin et al. concluded that a MG did not seem to influence breathing, regardless of at rest or at load, as long as it is well adjusted and has a good fitting. Even the oxygen supply did not seem to be negatively influenced at maximum load in elite athletes (eight ice hockey players and five team handball players) (28).

To continue with a FG after the mandatory period is very rare and therefore many amateur ice hockey players chose not to use any FG. Studies have shown that the risk of suffering from face injuries when not using a FG is 2.5 times higher than if it is used (29). Despite this increased risk, many amateur ice hockey players chose not to use a FG. This choice is contradictory to the present results, where instead older amateur players in division 3 could allow themselves to use a FG. A half visor has shown to be comparable with no face protection at all (30).

Among 190 amateur ice hockey players in the USA who used a FG, almost half (46%) suffered at least one serious ice hockey injury during a 5-year period (31). These injuries were mostly injuries to the face (39%), concussions (18%), fractures (14%) or dental injuries (10%). Of those players who used a FG, 69%

reported they felt able to play more aggressively. These players significantly more often reported strains, overstraining injuries and other serious injuries than dental and jaw injuries and therefore more often required medical care than other players.

One may ask whether the use of FGs provokes a false sense of security that may lead to exaggerated risk-taking behaviour (32, 33). Woods et al. (31) verified to some extent exaggerated risk-taking behaviour among amateur ice hockey players when a FG was used. Unfortunately, it is difficult, if not impossible, to quantify aggressive attitudes in ice hockey. Moreover, it might be that players with a FG played less aggressive than players without a FG. The results should therefore be interpreted carefully.

Tran et al. assessed 25 male and female ice hockey players to determine whether a FG interferes with their peripheral vision and reaction time. The authors found a significant longer reaction time when visualizing 90° to the right and 180° (34). This longer reaction time could be due to the blocking of the right visual sight with the dominating right hand, or by the special construction of the FG used in the study. These results suggest the need to study the visual field and its influence on reaction time using different types of helmet (34). Visors have not been shown to affect the visual field (35).

Another category was '*What do the participants believe about the attitudes of the other focus groups?*' The results showed a good understanding and concordance in what the different groups thought about each other. A gender difference was found, indicating that fathers were less concerned about dental injuries than mothers. The difference may relate to the male fighting spirit vs the female protection mechanism.

The category '*The elite club wished that their young players, even at an early age, focused entirely on ice hockey*' reflects the notion that elite management wants their players to exclude all other sports even during their younger years. The parents appreciated this kind of information from the elite management, because it made it easier for them to support their child.

Both clubs concurred with the statement '*Knowledge of what is included in sports insurance is insufficient*'. The insurance policy differs for elite and nonelite ice hockey players. This difference could lead to that division 3 players ignore dental injuries and therefore lose the possibility to receive economic compensation in the future.

The costs of dental injuries and mouth and face equipment were serious issues for the participants, especially among division 3 participants, who too often have to make a decision as to whether they can afford to buy a MG. Woods et al. (36) studied whether it was cost effective to have amateur ice hockey players use a FG to avoid injuries. The authors calculated the costs of two FGs each during a 5-year period for those who generally did not use a FG. Increased treatment costs were included for those who played more aggressive hockey when using a FG. The reduced cost owing to fewer face injuries during the 5-year period was also calculated and the savings estimated. The net saving was $250/5 years/player. Despite this result, one has to be careful to draw any conclusions because of the study's limitations. Still, the results are worthy of pursuing among both amateur and elite players.

Numerous proposals were suggested related to reducing dental and jaw injuries in ice hockey in the category '*Suggested measures*'. These proposals included the areas of responsibility and cooperation, information and education, ethical and moral behaviour, mandatory use of a MG as a senior player and the development of mouth and face guards. Because of the beneficial characteristics of these measures as a basis for further discussions on different levels, they are separated on a local (the club only), a regional (a number of closely related clubs), a national (The Swedish Ice Hockey Association and parties concerned) and an international level (International Ice Hockey Federation and NHL) (Table 3).

The participants also discussed a Fair Play Programme (FPP), which was introduced in Canada during the 2001/2002 season at the same time when the present study was initiated. Brunelle et al. (37) evaluated the effect of this FPP programme, concluding that FPP should be considered as an integral part of a larger project in which knowledge among referees, linesmen, trainers and team management should improve and that discussions should begin to promote the healthy values in sport. All elements that are now involved in ice hockey should be included in such a project, including parents of young ice hockey players.

In conclusion, there are many ways to carry out changes. We must begin to consider that injuries and even deaths due to accidents are not random events, but predictable and therefore can be prevented (5). Questions about our health often contain a certain amount of conflict between private liberty and the benefit for the majority. When the benefit for the majority is estimated to be more important than the liberty of private persons, laws and rules mostly limit the liberty of private persons. One example is the regulation to use seat belts in cars, where private interests were ignored to benefit the majority (22).

When either a MG or a FG guarantees a reduction in dental and jaw injuries in ice hockey, the best strategy is to follow the established rules and regulations. Referees and linesmen should be able to follow rules and regulations without feeling intimidated by team leaders or the public to bend or stretch the rules. Players, referees and linesmen should be required to use mandatory and certified equipment. Education is important but it is only effective if it changes people's attitudes, if it can be shown that the attitudes are the cause of the problem. Several sources of help are necessary to reduce the incidence of injuries, especially from the medical profession, which in many cases has contributed to important changes in those sports in which the risk of traumatic injuries has been high.

An explorative and qualitative design with a phenomenographic approach was chosen to identify and describe player attitudes towards mouth and face guards in amateur and elite ice hockey. A combination of qualitative and quantitative methods would be worthwhile, in that it would provide the most reliable and valid research results. The phenomenographic

method could be used to look for relevant and suitable questions or categories, which then could be used to develop a quantitative questionnaire.

It is well known that people *may* change their opinions after becoming more familiar with a given phenomenon. It is therefore our hope with this study that Swedish ice hockey, which has been a part of the Victorian sporting scene for over 100 years, should continue to be a high-velocity collision sport, but with less fear of unexpected dental and jaw injuries.

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