Ice hockey is a team sport that requires speed, agility, and power. The hard surfaces of the ice and side boards, fast-moving pucks and sticks, and players checking other players provide numerous opportunities for injury. As enthusiasm for ice hockey grows, participation in youth, high school, junior, and recreational programs will also increase.

The risk of injury in ice hockey varies considerably. Previous investigations have studied rates of injury at different levels of participation, in games versus practice, with and without protective equipment, with and without fatigue or aggressive behavior, using different rules and regulations, and with various styles of play.

Protective Facial Equipment

The face is a common site of injury for hockey players. Facial laceration is one of the most common injury types—both of injuries to the face and of hockey injuries overall.

Face protection was first mandated in amateur and collegiate hockey players in the late 1970s. The original purpose was to reduce the number of eye injuries caused by hockey sticks and flying pucks. When used, head and facial protection has been effective in nearly eliminating ocular, facial, and dental injuries.

Face protection is not required for all levels of play. Although some facial protection is required for collegiate and youth leagues, it is not required for players in the National Hockey League nor for players in adult recreational leagues.

This study’s purpose was to investigate the frequency with which facial protection is used by adult recreational hockey players. We also studied their attitudes about using facial protection. We chose to study players in an adult recreational hockey league because adult recreational players are those among whom there
is controversy about the importance of using facial protection.

Methods
The methods for this research were approved by the Institutional Review Board of TriHealth Hospitals.

Subjects
Subjects for this study were members of 32 recreational hockey teams that played at two indoor hockey rinks in Evandale, Ohio, during the months of October 2005 to March 2006. The teams require players to be 18 years or older, but there is no requirement that players use face protection.

We randomly chose 193 members from 18 of the 32 teams. Goalies were excluded. One of the investigators personally conducted the surveys by interviewing players prior to games.

Instrument
The survey questionnaire contained 17 items that asked about whether players used full, partial, or no face protection (Figure 1). Questions also asked about players’ demographic characteristics and hockey experience, frequency and location of serious injuries experienced in the past, care required for those injuries, reasons for using or not using facial protection, whether helmet use influenced aggressiveness of hockey play, and alcohol use during hockey play.

The survey instrument was based on questions used in previous studies. We externally validated the instrument by surveying a small group of recreational players outside of the target population.

Data Analysis
We used Pearson chi-square and Fisher exact test for categorical variables and a t test for continuous variables. Alpha was set at 0.05 and beta at 0.10.

Results
Of the 193 hockey players invited to participate in the study, 190 agreed to do so and three declined. The mean age of study participants was 34 ± 8.7 years and 99% were male. Participants had been playing hockey for an average of 17 years.

Injuries
Overall, 87 (46%) of the players reported experiencing at least one serious injury while playing hockey, with a mean of 1.4 serious injuries during the last 5 years. The most common of these injuries were facial laceration (39%), concussion (18%), fracture (14%), and dental injury (10%).

Of the 87 respondents who reported an injury, 44% required emergency room care, 41% required care from a specialist physician, 22% required surgery, and 5% required ambulance transport. Thirty-two percent missed work due to their injury. Seven percent reported being under the influence of alcohol at the time of injury.

Facial Protection Injury
Twenty percent of players who reported an injury also reported not using facial protection (either at the time of the injury or currently). Those without facial protection were significantly more likely to report a facial laceration (odds ratio [OR] = 3.40, 95% confidence interval [CI] = 2.0–5.8) or facial bone fracture (OR = 10.1, 95% CI = 1.23–83.4) compared to those using face protection (Table 1). The most common reasons cited for not wearing facial protection were for comfort and enhanced visibility.

Facial Protection and Aggressive Play
Sixty nine percent of those wearing facial protection reported that they felt they could “play more
aggressively” when using the protection. These face-protection users were significantly more likely to report a strain/sprain injury and reported more serious injuries (OR=1.74, 95% CI=1.15–2.61), and they were more likely to have required care by a physician (OR=1.82, 95% CI=1.20–2.76) and by a specialist physician (OR=1.68, 95% CI=1.21–2.36).

Other Correlates of Facial Protection Use

Players not using facial protection reported significantly more years of hockey experience (11.7 versus 10.5, P<.05), but there was no difference between the age of users and non-users. Fifty-eight percent of the players reported that they knew someone who sustained a major facial injury, and 49% knew someone who sustained a major concussion playing hockey, but players who knew someone who sustained such injuries were not significantly more likely to wear face protection.

There was no difference in the rate of non-facial fractures between users and non-users of facial protection. There was no difference between users and non-users of facial protection in the rate of dental visits, emergency visits, missed work, needing an ambulance, or use of alcohol at the time of injury.

Discussion

Research has documented a reduced risk of hockey-related head and facial injuries when players wear helmets and facial protection, but these injuries still occur because many players do not wear facial protection. In our survey, 20% of players did not use facial protection.

The need for facial protection has generated some controversy. Indeed, partial facial protection has been proposed to be an effective alternative to a full-face mask for preventing ocular injuries and decreasing lacerations, but many have rejected the hypothesis that partial face protection is effective. Our study did not include a sufficient number of subjects to test whether there was a difference in injury rates among those using partial versus full-face protectors.

Others have speculated that use of helmets and facial protection has a negative effect by creating a false sense of security that leads to excessive risk-taking behavior and a resultant increase in illegal and injurious behaviors, but our data suggest that this may, at least to some degree, be true. Sixty-nine percent of our players using facial protection reported that they could “play more aggressively” with the protection, and players using facial protection reported significantly more cumulative serious injuries and were more likely to report a strain or sprain injury. Aggressive attitudes during hockey play are difficult to quantify, however, and it is possible for players using facial protection who felt they could play more aggressively actually played less aggressively than those not using facial protection.

<table>
<thead>
<tr>
<th></th>
<th>Face Protection (n=59)</th>
<th>Without Face Protection (n=28)</th>
<th>Odds Ratio (P Value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facial laceration</td>
<td>22%</td>
<td>75%</td>
<td>OR=3.40, 95% CI=2.0–5.8* (p&lt;.01)</td>
</tr>
<tr>
<td>Facial bone fracture</td>
<td>3%</td>
<td>22%</td>
<td>OR=10.1, 95% CI=1.23–83.4* (.02)</td>
</tr>
<tr>
<td>Strains/sprains</td>
<td>61%</td>
<td>32%</td>
<td>OR=1.74, 95% CI=1.15–2.61** (.01)</td>
</tr>
<tr>
<td>Doctor visits</td>
<td>63%</td>
<td>32%</td>
<td>OR=1.82, 95% CI=1.20–2.76** (&lt;.01)</td>
</tr>
<tr>
<td>Require specialists</td>
<td>53%</td>
<td>21%</td>
<td>OR=1.68, 95% CI=1.21–2.36** (&lt;.01)</td>
</tr>
<tr>
<td>Dental visit</td>
<td>10%</td>
<td>11%</td>
<td>(.6)</td>
</tr>
<tr>
<td>Emergency room visit</td>
<td>53%</td>
<td>61%</td>
<td>(.32)</td>
</tr>
<tr>
<td>Missed work</td>
<td>37%</td>
<td>21%</td>
<td>(.11)</td>
</tr>
</tbody>
</table>

* Without face protection compared to wearing face protection
** With face protection compared to no face protection

OR—odds ratio
CI—confidence interval
Alcohol Use

An unexpected finding of our study was a 7% rate of reported alcohol use at the time of injury. While our study was not designed to investigate the routine prevalence of alcohol use while playing hockey, no previous research has reported the use of alcohol by hockey players. Because players may be embarrassed to report drinking alcohol while playing hockey, the prevalence of 7% in our study is likely an underestimate. Given the association of “playing more aggressively” with higher overall injury rates, it would be important to investigate if players using alcohol report losing inhibition and, therefore, playing more aggressively.

Limitations

Our study has three key limitations that should be considered when interpreting the results. First, it is possible that the 190 surveyed players in this study were not representative of recreational players nationally. They are, however, likely to be representative of players in our geographic area.

Second, our data are self-reported and, therefore, our results may be influenced by recall bias. An observational cohort study could produce a better estimate of injuries and facial protection use.

Finally, hockey is one of the fastest growing sports for women, but in our population only two of the players were female (both reported wearing facial protection). Because of the small number of women in our study, our study results are only applicable to male hockey players.

Conclusions

Twenty percent of recreational hockey players in our survey who had experienced a prior serious injury reported not using facial protection at the time of the injury. Those without facial protection were significantly more likely to report having experienced a facial laceration or facial bone fracture. Those who did report wearing protection, however, felt they could “play more aggressively” with the protection and had higher rates of other (non-facial) serious injuries.

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REFERENCES