Attitude toward mouthguard utilization among North Indian school children

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Abstract

Objectives: The present study was designed to evaluate the attitude toward mouthguard utilization among 8–11-year-old athletically active schoolchildren in Ludhiana, Punjab, India. Materials and Methods: A cross-sectional survey was conducted among 2,000 schoolchildren aged 8–11 years of both the sexes, attending private schools in Ludhiana, Punjab, India. Children were questioned about their perceptions regarding the protective role of mouthguards and the reasons behind not using mouthguards. The data were summarized and analyzed using the statistical software Statistical Package for the Social Sciences (SPSS) version 18.0. Results: The prevalence of mouthguard use was found to be only 4.25%. However, 78% of the children believed that mouthguards could protect them from injuries. On the other hand, a majority of the children using mouthguards (74.11%) said they would be willing to play without a mouthguard. Of the 85 children using mouthguards, 76 reported problems. Children using dentist-made mouthguards reported it to be expensive while the children wearing boil and bite mouthguards reported several other problems such as difficulty in speaking and interference with breathing. Conclusion: It was deduced that the usage of mouthguards in this age group was inadequate and dentists need to be targeted for recommendation of properly fitting custom-made mouthguards to the parents of susceptible children so that a positive behavior toward mouthguards is reinforced.

Key words: Attitude, boil and bite mouthguard, custom-made mouthguard, dentoalveolar fractures, mouthguard, orofacial injury, schoolchildren, sports injuries

INTRODUCTION

A majority of the children round the world traumatize their permanent teeth even before they reach adolescence. The focus on injuries during sporting activities has increased during recent years more because these injuries can be prevented or at least reduced in intensity by the use of properly designed equipment. According to different reports, sports-related facial fractures account for 4–18% of all sports injuries and 6–33% of all facial bone fractures.[1]
The most common preventive measure recommended for use by the youth and adolescent athletes is the mouthguard. A mouthguard (or mouth protector) is a resilient device or appliance placed inside the mouth to reduce mouth injuries, particularly to the teeth and surrounding structures.[2] Athletic mouthguards are designed to protect the lips and intraoral soft tissue from lacerations, the teeth from fractures and avulsions, and the jaws from fractures and dislocations.

By providing a protective surface to distribute and dissipate transmitted forces on impact, mouthguards can minimize the risk of sustaining trauma to dental hard and soft tissues or minimize the severity of that trauma. The most common types of mouthguard available to athletes comprise: Type I—stock mouthguards, bought over the counter, Type II—mouth-formed boil and bite mouthguards that are made from a thermoplastic material that is immersed in hot water and then formed in the mouth by the athlete using his/her finger, and Type III—custom-made on a model of the patient’s mouth.

Despite the availability of mouthguards and their role in reducing injuries, much more needs to be done to educate patients about mouthguard use and the risks of dental trauma in sports. Athletes often are hesitant to wear mouthguards with regularity during play.[2] In many cases, athletes do not wear mouthguards despite being aware of the injury risks.[3]

Thus, the present study was designed to evaluate the attitude toward mouthguard utilization among 8–11-year-old athletically active schoolchildren in Ludhiana, Punjab, India.

**MATERIALS AND METHODS**

A cross-sectional survey was conducted among 2,000 schoolchildren aged 8–11 years of both the sexes attending private schools in Ludhiana, Punjab, India. Fifty athletically active children were selected from 40 private schools of Ludhiana. Stratified random sampling was adopted to select the children. Among the selected schools, children participating in competitive sports belonging to the age group of 8–11 years were included in the study.

The data were collected by personal interview with the children using a questionnaire [Table 1]. The children were questioned regarding the use of any type of mouthguard (stockmouthguard, boil and bite mouthguards, or custom fabricated mouthguards); their perceptions regarding the protective role of mouthguards and reasons behind not using mouthguards (never thought about it, cannot see a reason to wear one, never had an injury, too expensive, or uncomfortable) were evaluated.

The mouthguard users were questioned regarding the age of starting mouthguard use and attitudes toward playing without a mouthguard (would be reluctant to play without it, would not play without it, or would be willing to play without mouthguard; problems associated with the use of mouthguards). A pilot study was conducted on 50 athletically active children relating to their attitudes toward the mouthguard. The doubts related to the questions were analyzed and

**Table 1: Questionnaire for evaluating the attitude toward mouthguard usage among the study population**

| Questions                                                                 | %     |
|--------------------------------------------------------------------------|-------|
| Have you ever used a mouthguard?                                         |       |
| Yes                        | 73 (3.65%) |
| Boil and bite              | 12 (0.6%)  |
| Custom-made                | 1,915 (95.75%) |
| No                         |       |
| If no, why not?             |       |
| Never thought about it      | 1,063 (53.51%) |
| Cannot see a reason to wear one | 343 (17.91%) |
| Never had an injury         | 302 (15.77%)  |
| Too expensive               | 207 (10.81%) |
| Do you believe that mouthguards protect your teeth?                       |       |
| Yes                        | 1,564 (78.20%) |
| No                         | 436 (21.80%)  |
| How old were you when you first started wearing a mouthguard?             |       |
| 6 years                    | 8 (3.53%)  |
| 8 years                    | 24 (12.2%)   |
| 9 years                    | 20 (9.5%)    |
| 10 years                   | 58 (26.7%)   |
| How would you feel about playing or training without wearing your mouthguard? |       |
| I would not play without it | 18 (15.3%)  |
| I would be reluctant to play without it                                  | 9 (10.99%)  |
| I would be willing to play without it                                    | 58 (74.11%) |
| Have you ever experienced problems with your mouthguard?                 |       |
| Yes                        | 76 (89.4%)   |
| No                         | 9 (10.6%)    |
| If yes, what are these problems?                                         |       |
| Interferes with breathing                                              | 16     |
| Feels loose                                                             | 18     |
| Uncomfortable                                                          | 26     |
| Difficult to speak                                                     | 41     |
| Too expensive                                                          | 23     |
then the questionnaire was modified accordingly. The reliability of the questionnaire was determined by using Cronbach’s alpha coefficient test value degree 0.82.

Around 100 children were reassessed for their attitude toward mouthguard utilization to assess the interobserver agreement (Cohen’s kappa), and it was found to be substantial (kappa = 0.65).

All results were analyzed using the SPSS Inc. Released 2009. PASW Statistics for Windows, Version 18.0. Chicago: SPSS Inc.

RESULTS

A total of 2,000 children were examined in the survey, 853 (42.65%) females and 1,147 (57.35%) males. The prevalence of mouthguard use was found to be very low. Only 85 (4.25%) participants reported its use. Of the 85 children, 73 used a boil and bite mouthguard while only 12 used a custom fabricated mouthguard. None of the children were using stock mouthguards.

However, 1,564 (78.20%) children believed that mouthguards could protect them from injuries while 436 (21.80%) the children did not [Figure 1].

When the children not using mouthguards were evaluated, it was seen that a majority (55.51%) of them had never thought of using a mouthguard while 343 (17.91%) said that they could not find a reason to wear one. Around 15% of the children said that they never had an injury while 207 (10.81%) children found it to be too expensive [Figure 2].

When asked about the age at which the children started using mouthguards, it was seen that 38 (44.7%) participants started using it at the age of 10 years and only 3 (3.53%) were found using it from the age of 6 years [Figure 3].

A majority of the children using mouthguards (74.11%) said that they would be willing to play without a mouthguard while only nine (10.59%) children said that that would be reluctant to play without a mouthguard. None of the participants were actually found to be willing to play with the mouthguard [Figure 4].

Nine out of the 85 children using mouthguards reported that they did not have any problem with the mouthguard they were using. However, 67 of the 73 children using boil and bite mouthguards and 9 out of the 12 using custom-made mouthguards reported problems. With the dentist-made (i.e., the custom-made mouthguard), all the children had the problem of it being too expensive while the children wearing shop-bought (boil and bite) mouthguards reported several other problems such as difficulty in speaking (41 times), discomfort (26 times), the mouthguard too expensive (23 times), feeling loose (18 times), and interfering with breathing (16 times).
DISCUSSION

Sports are a frequent cause of injury in general to children and adolescents. Mouthguards have the ability to prevent many kinds of orofacial injuries including dentoalveolar fractures. In the present study, mouthguard use was reported by only 4.25% of the population. Lehl[3] also reported in an Indian study that mouthguards were the least preferred and used among orofacial equipment. Fakhruddin et al.[4] in a study on 12–14-year-old Ontario schoolchildren had found a similar, though higher (5.5%) mouthguard usage. Out of the 2,000 participants enrolled for the study, only 73 (3.65%) were found to use a boil and bite type of mouthguard and 12 (0.6%) participants used a custom fabricated mouthguard.

The use of mouthguards has been very limited in previous studies too. Pribble[5] had found that in the age group of 8–14-year-old rugby players, only 14% used a mouthguard. The only other Indian study to assess mouthguard usage among participants was conducted by Ramagoni, Shetty, and Hegde.[6] They, however, reported a very low mouthguard usage of about 1.25% in the 11–14-year-old age group.

This study also took into account the attitude toward mouthguards of the various participants. When asked if the children believed that the mouthguards could protect their teeth from injuries while participation in sports activities, around 78% of the participants answered in favor of mouthguards. Similar results have been reported by Ramagoni, Shetty, and Hegde[6] among the children of South India. 73.2% of the children in that study had considered that mouthguards could prevent injuries during participation in sports.

However, studies by Biagi et al.[7] reported that a positive response toward the protective effect offered by mouthguards does not necessitate mouthguard usage. They found that 80% of the children reported knowledge of the protective effects of mouthguards, whereas only 5% actually used them. Thus, in the present study, an effort was made to elicit the reasons behind not using mouthguards among all the nonusers.

When asked about the reasons behind not using mouthguards, the following responses were obtained.

- **Never thought about it (35.51%)**: This reflects that the population that did not know whether they needed mouthguards or not. They were aware about the usefulness of mouthguards but they were not guided by their coaches/dentists/parents to use them to prevent an injury
- **Cannot see a reason to wear one (17.91%)**: The participants in this category were found to be not aware of the protective role of mouthguard. Thus, they need to be provided with proper guidance regarding the protective effects of mouthguards and their protective role in sport injuries so as to make them aware of these protective devices before they actually encounter a sports-related orofacial injury
- **Never had an injury (15.77%)**: These participants would be considered as the most difficult ones to be convinced in using mouthguards. They are aware of the protective role of mouthguards but were still not willing to use one as they believed that they needed to have an injury before using the protective equipment
- **Too expensive (10.81%)**: These participants were seen to be most aware of the protective role of mouthguards. This category included participants who thought that such kind of protective devices were expensive. Matalon et al.[10] had also revealed that 20% of the participants had reported cost as the factor behind not using mouthguards.

![Figure 4: Attitude of participants towards playing without a mouthguard](image-url)
Among the children using mouthguards, a majority were seen to start the use of mouthguards at 10 years of age (44.7%). At the age of 8 years, only 28.24% reported starting the use of mouthguards. It has been reported by Ranalli\cite{11} after an extensive review of the literature that the age at which maximum injuries’ occur was around 8 years. The reasons for that have been listed by Pinkham and Kohn.\cite{12} These include:
• The athletic skill levels of children at this age are not matured
• The children at the period of growth spurts are at increased injury risk because growth is expressed first in the long bones and then in the muscles, causing a tremendous loss in flexibility.

Thus, a majority of the participants need to be made aware regarding the starting of mouthguard use at an early age so as to reduce the incidence of sports-related orofacial injury.

This study also evaluated the “attitude of mouthguard users” toward the equipment. It was found that 74% of the participants were willing to play without using the mouthguard. Thus, it was clear that they had some problems using this equipment. 10.59% of the participants revealed that they would be reluctant to play without mouthguards. With the option of “would not play without mouthguard” being available, it seems that these children need to be reinforced about the benefits these mouthguards offer so that they would continue to use them in a “definitely positive” manner. Around 15% of the mouthguard users proclaimed that they would not play without the mouthguard.

In this study, 67 of the 73 children using boil and bite mouthguards and 9 of the 12 children using custom-made mouthguards reported one or the other problem. Although few children using a boil and bite mouthguard had the problem of the equipment being quite costly (19%), a majority reported problems such as difficulty in speech (33%), the mouthguard feeling loose (14%), discomfort (21%), and some even reported the mouthguard to interfere with breathing (13%).

Boil and bite mouthguards become ill-fitting with continued usage. The reasons for this include the uncontrolled and nonequally distributed forces applied by the athletes during their adaptation into the oral cavity before the game.\cite{4} Gebauer et al.\cite{13} had listed breathing problems and impairment of communication as the major problems faced by athletes that were associated with mouthguard usage. Matalon et al.\cite{10} had reported in their study that 42% of the participants did not consider mouthguards as comfortable. Moreover, boil and bite mouthguards can be problematic as they tend to become loose with the progression of the game.

In this study, nine out of the 12 children using custom-made mouthguards reported them to be very expensive with no other problem that could interfere with their usage in sports activities. Studies have also supported the fact as they found that custom-made mouthguards were better in fit and reported less problems compared to the boil and bite variety of mouthguards.\cite{2,14}

**CONCLUSION**

It was seen that the attitude of the participants toward the use of protection offered by the mouthguards was fairly positive and most of them were not using it due to a lack of proper guidance. Thus, coaches/parents/dentists need to make the children aware of the risk of injury and emphasize on the protective role of the mouthguard at an early age.

Dentists need to be targeted for recommendation of properly fitting custom-made mouthguards\cite{15} to the parents of susceptible children so that a positive behavior toward mouthguards is reinforced and the number of problems associated with mouthguards decrease, making mouthguard usage among athletes a pleasant experience.

The main drawback of this study was the very limited number of participants who were found to be using mouthguards. However, as mouthguard usage would increase among the participants (with increasing awareness), more competent results will be available on this subject and more consistent data can be obtained.

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**Conflicts of interest**

There are no conflicts of interest.

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