

Parental Awareness Regarding Use of Mouthguards During Contact Sports in 7-16-Year-Old Children at Pune, India.

¹Madhur M. Nijsure, Post Graduate Student, Department of Pedodontics, M.A. Rangoonwala College of Dental Science And Research Centre, Pune

²Iqbal E. Musani, Professor, Department of Pedodontics, M. A. Rangoonwala College of Dental Science and Research Centre, Pune

³Smita I. Musani, Professor, Department of Prosthodontics, M. A. Rangoonwala College of Dental Science and Research Centre, Pune

⁴Mital V. Kevadia, Post Graduate Student, Department of Pedodontics, Bharati Vidyapeeth Dental College & Hospital, Sangli

Corresponding Author: Madhur M. Nijsure, Post Graduate Student, Department of Pedodontics, M.A. Rangoonwala College of Dental Science and Research Centre, Pune

Type of Publication: Original Research Paper

Conflicts of Interest: Nil

Abstract

Background: Sports promote children's health. All sport activities carry a risk of orofacial injury due to falls and collisions. Majority of dental injuries are seen in children between ages of 7 and 11 years. Injuries to teeth are distressing to children and parents. This risk can be reduced by using a mouthguard. Despite growing evidence about the importance of mouthguards, its mandatory use in sports is not universal. Awareness of parents and players toward wearing mouthguards influence their usage. Thus, the aim of the study was to evaluate awareness of parents regarding mouthguard utilization among 7–16-year-old children playing contact sports at Pune, India. A questionnaire was sent to parents of 1000 children involved in contact sports activities at 15 academies throughout Pune city. The questionnaire sought demographic information about the child, the sport the child participates in, parent's perceptions about contact

sports related injuries and mouthguard use. Data was subjected to appropriate statistical tests. 517 questionnaires were returned. 17 questionnaires were incorrectly filled and thus were rejected leading to final working sample size of 500 study subjects. Mouthguards were used by 36.2% of the children. 24.4% children had a mouthguard policy at their sports academy. Reasons for wearing mouthguards included injury prevention, recommendation, mandatory use, etc. reasons for not wearing included no experience of injury in the past, lack of awareness, lack of policy. 28% of children had a positive history of trauma, 93.6% times teeth were involved. 41.2% immediately visited the dentist while 20.6% never visited a dentist for treatment. Thus, there is lack of awareness in parents about the risk of dental injuries during sports. Awareness should be created among parents regarding mouthguard use for their child during sports.

Keywords: Contact sports, Dental trauma, Children, Mouthguards, Parental awareness.

Introduction

Substantial health benefits are conferred by regular physical activity, even in small doses.[1] Increasing number of children and adolescents worldwide are participating in sports activities.[2] Playing sports contributes to development of muscles, coordination, cardiovascular health and innumerable other benefits associated with disease prevention. Sport and physical activity can make a valuable contribution to the health and welfare of people in developing countries.[3] However, many of these high-impact activities, such as soccer, mixed martial arts, hockey, football, wrestling, and boxing, constitute serious health risks as well. Impact during these sports can lead to broken or avulsed teeth, facial lacerations, fractured bones, and other injuries.[4] It is possible to prevent trauma to teeth and orofacial region and dramatically reduce the occurrence levels by the use of mouth-guards that protect the dental and periodontal tissues.[5] An athletic mouthguard is a resilient device or appliance placed inside the mouth to reduce injuries particularly to the teeth and surrounding structures. In contact sports, it is important that the mouthguard provides protection from direct and indirect impact. It must fit perfectly, stay steady during impact, and redistribute its energy.

The Academy for Sports Dentistry (ASD) endorses the use of an accurately fitted mouthguard. It advocates the use of a custom fabricated mouthguard made over a dental cast and delivered under the surveillance of a dentist. The ASD reinforces a mandate for use of a properly fitted mouthguard in all collision and contact sports.[6] For a child, a parent is the primary source of information. It is often the parents who decide whether mouthguards should

be worn or not by their child. Parents' knowledge and awareness influence its use. In spite of the growing evidence of mouthguard in injury prevention, its use in contact sports is still not universal. Many studies in India and other countries show inadequate levels of knowledge, awareness and use of the protective devices.[7-11] Therefore the aim of the present study was to evaluate awareness of parents regarding mouthguard utilization among 7–16-year-old children playing contact sports at Pune, India.

Materials and Methods

The study included parents of children at various contact sports academies at the city of Pune, India. Ethical approval was obtained from Institutional Review Board. Children in the age group of 7 to 16 years were selected. A random sample of 15 academies was selected via lottery method. A questionnaire having 21 questions [Figure I] was designed and a pilot survey was conducted among 50 parents to check the reliability and validity of the questions. Informed consent was obtained from participating parents verbally and in written form distributed along with the questionnaire.

For conducting main study, minimum sample size calculation was found to be 385 subjects assuming estimated prevalence (P) of 50% having awareness regarding use of mouth guards during contact sports. The questionnaire was then distributed to 1000 parents of children playing contact sports. It sought demographic information about the child, the sport the child participates in, parent's perceptions about contact sports related injuries and mouthguard use, injury prevention and the history of sports related injuries and treatment. Parents were provided with the option of asking questions, doubts during filling of questionnaire with the investigator. The data was compiled on MS excel sheet and statistical analysis was performed using statistical product and

service solution (SPSS) version 16 for Windows (SPSS Inc, Chicago, IL). Chi square test was used to analyse the proportion/ percentage data.

1. Child's Name	Age: -- years--- months	Gender: M / F
2. Mother's name	contact no.	email id
3. Name the sports your child play		
4. Do you feel mouth and tooth injuries are common in sports?		Yes / no
5. Do you feel that use of mouth guard while playing will prevent teeth injury?		Yes / no
6. Does your child's school / sports academy have a policy about wearing mouth guards?		Yes / no / don't know
7. If mouth guard usage is mandatory, would it significantly reduce mouth/tooth injuries?		Yes / no
8. Does your child wear a mouth guard		yes/ no
9. If yes, it is because (a) Mandatory (b) Prevents injury (c) Recommended by someone (d) increases child's performance whilst playing (e) other		
10. If no, it is because (a) Never thought about it (b) You do not feel it is necessary (c) Never had an injury so far		
11. From whom you got information about mouth guards?		
a. Coach b. Dental professional c. Family member d. Magazine e. Media e. Any other		
12. How old was your child when he/she first used a mouth guard? ----- years / NA		
13. Which type of mouth guard does your child wear?		
a. Custom made (made by a dentist, fits exactly in mouth and comfortable and protective)		
b. Boil and bite (available in preformed shape and sizes, can be made at home, does not provide adequate protection)		
c. Ready to wear (available in shops, difficult to adjust, loose fit, difficult to breath & speak whilst playing, provide no good protection)		
14. How would you feel if your child plays without a mouth guard?		
a. Would not allow playing b. Reluctant to play c. willing to play		
15. Will your child's performance enhance with mouth as he feels secure and confident?		Yes / no
16. Do you remember about your child or any other child having accidents in past, while playing a sport ?		Yes / no
17. Did such an accident involve the child's teeth?		Yes/no
18. Were the teeth involved permanent or baby teeth? (a) Permanent teeth (b) Deciduous (baby teeth)		
19. How long after the accident you visited the dentist? (a) Immediately (b) within two hours, (c) After more than 2 hours, (d) within a week, (e) within a month (f) After a month (g) never		
20. Was your child wearing mouth guard during the accident?		Yes / no
21. Would you like to have more information about mouth guard?		Yes/no

Figure 1: Questionnaire containing questions to assess awareness and confidence of parents and sought demographic information about the child, the sport the child participates in, parent's perceptions about contact sports related injuries and mouth guard use, injury prevention and the history of sports related injuries and treatment.

Results

Out of the 1000 questionnaires distributed, 517 were returned. When analysed properly for correctly filled questionnaires, 17 questionnaires were rejected leading to final working sample size of 500 study subjects. Among the total children sample 64.4% were males and 35.6% were females. Mean age of the children population was 12.6 years. Most of the children (27.4%) played karate followed by boxing (24.4%), kabaddi (17.6%), taekwondo (6.8%) while few preferred multiple contact sports. 75.2% of the parents agreed that orofacial and dental injuries are common in sports. Also, 79.2% parents responded positively about the role of mouth guards in injury prevention [Table 1]. Around, 75.8% of parents said that

mouthguards if made mandatory will reduce the prevalence of sports related orofacial and dental injuries.

Table 1: Do you feel that use of mouth guard while playing will prevent teeth injury?

	n	%	Chi-square test	p value, Significance
YES	396	79.2	Chi = 170.52	p <0.001**
NO	104	20.8		

**p <0.001 - highly significant difference

Only 36.2% parents reported that their children wear mouthguards (Figure II). The mean age of the children to first time use mouthguards was 10.51 years. Most common reason for wearing mouthguard was that it prevents mouth injury (55.8%) followed by mandatory policy at the institute (21.54%), increases child's confidence (16.57%) and least due to recommendations by others (6.07%)(Figure III). Of the children not using mouthguards, 55.17% did not use because they didn't have any past experience of trauma during sports, 35.7% never thought about using these protective devices and 9.09% said they did not feel it is necessary.

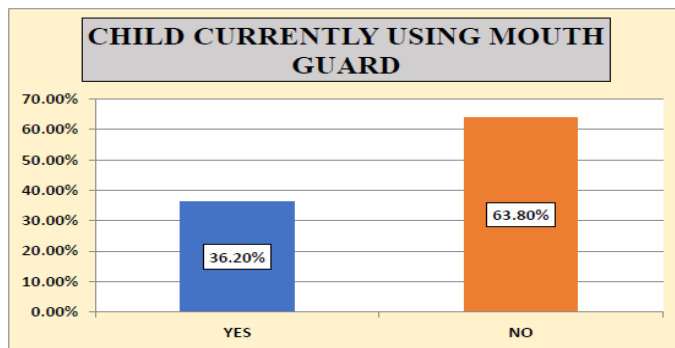


Figure 2: is a graph describing proportions of parents' who reported of their children wearing mouth guard.

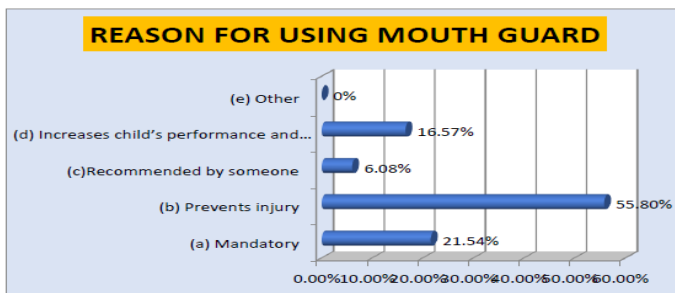


Figure 3: is a graph enumerating reasons for use of mouth guards during contact sports.

Parents mostly obtained information about mouthguards from coach (68.8%), dental professionals (15.8%), family members (6%), media (6%) and least from magazine (3.4%). All children using mouthguard (100%) used stock/ready to wear type of guard (Figure IV) .

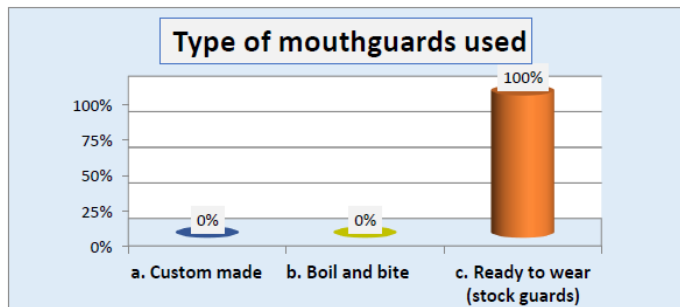


Figure 4: is a graph depicting type of mouth guards used by children during contact sports.

The parents were asked about their view if their child playing without using mouthguards, 35.6% said they would not allow their child playing without mouthguards, 27.2% said that the child would be reluctant to play, however, 37.2% said that the child will be willing to play without using protective devices. 85% of the total parents feel that their child’s performance and confidence will increase with mouthguard use because now the child will know that the mouth and teeth are safe. 28% of the parents report of their child having accidents in the past while playing a sport and 93.57% times, teeth were involved in the accident. Out of the involved teeth, 66.4% were permanent teeth while 33.6% were primary teeth. Of those having accidents during the play 80.2% parents reported of the child not wearing mouthguard during the accident whereas 19.8% parents said that the child was injured in spite of using mouth guards. Around 24.4% respondents confirmed that their child’s sports academy has a policy about wearing mouth guards (Table 2).

Table 2: Does your child’s school / sports academy have a policy about wearing mouth guards?

	n	%	Chi-square test	p value, Significance
YES	122	24.4	Chi = 205.5	p <0.001**
NO	64	12.8		
DON'T KNOW	314	62.8		

**p <0.001 – highly significant difference

When asked about treatment of the trauma, 41.2% of parents immediately visited the dentist with their child after trauma, 14.5 % sought treatment within 2 hours, 3.8% visited the dentist after 2 hours, 17.6% within a week, 1.5% within a month, 0.8% within 2 months however 20.6% never visited a dentist for treatment. 76.6% of parents are keen to have more information on mouth guards.

Discussion

Sports in India has witnessed a phenomenal growth in recent years with the organization of events such as commonwealth games, khelo India, hockey world cup, and winning of international medals as well. Today nearly 155 sports are played in India out of which 25 are high impact sports that are attracting players, viewers and sponsors. All these high impact activities carry a considerably high risk of trauma to the orofacial and dental tissues. mouthguards offer significant protection against sports-related injuries to the teeth and soft tissues.[4]

In the present study, the most commonly played sports are high contact activities possessing a risk of traumatic injuries and 28% of the parents report of their child experiencing trauma in the past while playing sport. Studies by Goswami M et al, Solanki N et al, Tiwari V et al, players reported similar prevalence of 20.9%, 26.65%, 39.1% respectively.[10, 12, 13].

Although majority of parents believed that orofacial injuries are common in contact sports and use of mouthguards could prevent injuries, the actual use was found to be low. Ramgoni et al conducted a study to

assess the awareness of children in south India and found that 73.25% of children were aware of its protective role however only 42.1% actually used mouthguards.[7] In another study by Goswami M et al, 71.3% were aware that mouthguards prevent injury but only 20.9% used them.[10] Hegde et al. also reported a lack of practice based application of mouthguards.[14] This shows that knowledge and awareness about mouthguards did not correlate with its actual use.

The reasons of not wearing mouthguard by the children were evaluated. the responses were:

- a. Never thought about it (35.73%): these parents were unaware of the availability of mouthguards
- b. Do not feel it is important (9.09%): these parents were aware of the device but were not convinced of its protective role in injury prevention and there was lack of counselling and encouragement by the coaches and dental professionals for its use.
- c. Never had an injury so far (55.17%): these parents were aware of mouthguards as well as its importance but still not using it for their children.

All the children used ready to wear type of mouthguards. These guards are made of rubber, available in limited sizes and they cannot be moulded to improve fit. The players need to hold them in place by constantly biting on the device. These mouthguards offer minimal protection and also interfere with speech and breathing. Use of custom-made guards should be thus encouraged. These are the best and are most protective and retentive.[4]

The mean age of the children to first time use mouthguards was similar to the study by Sethi et al who reported that a majority of children (44.7%) were seen to start the use of mouthguards at 10 years of age.[15] According to the American Dental Association's (ADA) council on access, prevention and interprofessional relations; ADA council on scientific affairs, school

children are most susceptible to sports related oral injury between the ages of 7 and 11 years. The reasons given were behavioural risk factors such as hyperactivity.[16] Pinkham states that young children are often not ready to cope psychologically with the complex rules or physical demands associated with team sports.[17] In developing children growth is expressed first in the long bones and then in the muscles, which leads to a temporary decrease in flexibility. This may be the reason for injuries during sports.[18] Therefore, parents should be counselled and encouraged to use mouthguards for their children at a younger age of 7 to 8 years.

The need of policy for mouthguard use at the academies is emphasised by the fact that 21.54% of the study population stated that the child uses mouthguard because it is mandatory at the sports academy. American National Collegiate Athletic Association, November 5, 1997 has mandated wearing of mouth protection in competition.[19] The International Kickboxing Federation, a leading kickboxing sanctioning body, and the International Sport Combat Federation, the first and largest mixed martial arts sanctioning body for pro and amateur mixed martial arts, have passed safety requirements that will require the use of mouth guards by all combatants who fight in sanctioned events. This represents one of the first athletic mandates for the use of Jaw Joint protective mouth guards by athletes.[20] However very few parents responded positively about their child's sports academy having a mouthguard policy is of great concern and botheration. Selva S et al, Tiwari V et al suggest that sports governing bodies and organizations should collaborate with dental hospitals to create awareness about injury prevention and mandatory use of mouthguards.[8, 13]

In the present study, parents were asked about the source of information of mouthguards where, Coach was found to be the most influential person in creating awareness about

mouthguard use. The role of dentists in promoting mouthguard use was low. Similar results were obtained in a study by Ramgoni et al where source of knowledge providers were coaches, school teachers and media in comparison to pediatric dentists.[7] Gardiner DM evaluated attitudinal factors influencing mouthguard utilization and found that awareness of coaches influenced the awareness of players. Dentists should also have a major role in counselling the parents and players about the importance of injury prevention and use of mouthguards.[21] Awareness about the potential risks the contact sports carry and the immediate action to be taken on having orofacial and dental trauma were evaluated. Of the parents whose children had dental trauma during the sports activity, 20.6% never visited a dentist after the accident is distressing. If appropriate treatment of dental trauma is delayed, this has negative effect on the treatment outcome and increases the chances of complications. This will have negative consequences for the tooth and growth and development of the alveolar bone leading to functional and aesthetic problems.[22] However, 41.20% report about immediate visit to the dentist for treatment of the trauma. Immediate care after a dental injury has been shown to increase the chance of survival of a damaged tooth and reduce the risk of post-injury complications.[22] It is encouraging that prompt action is being taken when an accident occurs.

Out of those children having dental trauma majority were not using mouthguards during the accident. This again highlights the consequences of lack of awareness. However, few were using the device which correlates with the minimal protection provided by the stock type of guards that the children used.

When asked about their view on the child playing without mouthguards, few parents said that they would not allow playing, or the child might be reluctant to play while

others still say that the child will be willing to play without using mouthguards. This might be because of the problems with using the stock guards. These can be bulky, increase the tendency to gag, and make breathing and talking difficult. Majority of parents were keen to have more information on mouthguards. This shows lack of knowledge and willingness of the parents to know about mouthguards for its utilization.

Conclusion

Parents should be informed regarding importance of mouthguard use in contact sport participation. Need for injury prevention and security of the child should be emphasized. Majority of children use stock type of mouthguards with minimal protection. These provide a false sense of security to the child. Use of custom-made mouthguards providing adequate protection should be encouraged. Coach is the most influential person in creating awareness. Dentists should also have a major role in creating awareness for injury prevention and use of mouthguards. National as well as regional academies for contact sports lack policies for mandatory use of mouthguards and therefore should adopt policy for safety of the players.

References

1. Khan KM, Thompson AM, Blair SN, Sallis JF, Powell KE, Bull FC, Bauman AE. Sport and exercise as contributors to the health of nations. *The Lancet*. 2012 Jul 7;380(9836):59-64.
2. Carter CW, Micheli LJ. Training the child athlete: physical fitness, health and injury. *British journal of sports medicine*. 2011 Sep 1;45(11):880-5.
3. World Health Organization. Health and development through physical activity and sport. Geneva: World Health Organization; 2003.
4. Altschuler C. Sporting mouthguards: preventing sports related orofacial injuries. AGD IMPACT- the

- news magazine for the general dentist. 2014 Aug;42(11)
5. Ferrari CH, De Medeiros JM. Dental trauma and level of information: mouthguard use in different contact sports. *Dental traumatology*. 2002 Jun;18(3):144-7.
 6. Position Statement: A properly fitted mouthguard. *Academy for Sports Dentistry Newsletter* 1998; 15:10.
 7. Ramagoni NK, Shetty YR, Hegde A. Do our children play safe? *Journal of clinical pediatric dentistry*. 2007 Apr 1;31(3):160-3.
 8. Selva S, Karthi R, Aparna S, Kumar PM. Awareness, prevention and management of dental injuries among the kabaddi players of Madurai District. *Journal of Dental Research and Review*. 2018 Jul 1;5(3):97.
 9. Praveena J, Battur H, Fareed N, Khanagar S, Bhat M. Orofacial injuries and use of protective wear among field hockey players of Coorg District, Karnataka, India—A KAP Study. *Indian Journal of Dental Research*. 2018 Nov 1;29(6):852.
 10. Goswami M, Kumar P, Bhushan U. Evaluation of knowledge, awareness, and occurrence of dental injuries in participant children during sports in New Delhi: a pilot study. *International journal of clinical pediatric dentistry*. 2017 Oct;10(4):373.
 11. Kamalesh R, Sharele JJ, Ganesh R. Level of awareness concerning dental trauma and its prevention among sportspersons in Chennai. *SRM Journal of Research in Dental Sciences*. 2017 Jan 1;8(1):1.
 12. Solanki N, Kaur G, Thukral R, Raval R, Agarwal A, Monga S. Orofacial and Dental Sports-related Injury Profile in School Going Children of National Capital Region, India. *Journal of International Oral Health*. 2016 Jul 1;8(7):795.
 13. Tiwari V, Saxena V, Tiwari U, Singh A, Jain M, Goud S. Dental trauma and mouthguard awareness and use among contact and noncontact athletes in central India. *Journal of oral science*. 2014;56(4):239-43.
 14. Hegde AM, Pradeep Kumar KN, Varghese E. Knowledge of dental trauma among mothers in Mangalore. *Dental Traumatology*. 2010 Oct;26(5):417-21
 15. Sethi HS, Kaur G, Mangat SS, Gupta A, Singh I, Munjal D. Awareness toward mouthguard utilization among North Indian school children. *Journal of International Society of Preventive & Community Dentistry*. 2016 Jan;6(1):69.
 16. AFFAIRS AC. Using mouthguards to reduce the incidence and severity of sports-related oral injuries. *The Journal of the American Dental Association*. 2006 Dec 1;137(12):1712-20.
 17. Casamassimo PS, Fields HW, McTigue DJ, Nowak A. *Pediatric dentistry: infancy through adolescence*. Elsevier Health Sciences; 2013 Nov 28.
 18. Pinkham JR, Kohn DW. Epidemiology and prediction of sports-related traumatic injuries. *Dental Clinics of North America*. 1991 Oct;35(4):609-26.
 19. Hawn KL, Visser MF, Sexton PJ. Enforcement of mouthguard use and athlete compliance in National Collegiate Athletic Association men's collegiate ice hockey competition. *Journal of athletic training*. 2002 Apr;37(2):204.
 20. International Kickboxing Federation (IKF) and the International Sport Combat Federation (ISCF - www.ISCFMMA.com)
 21. Gardiner DM, Ranalli DN. Attitudinal factors influencing mouthguard utilization. *Dental Clinics of North America*. 2000 Jan;44(1):53-65.
 22. Alnaggar D, Andersson L. Emergency management of traumatic dental injuries in 42 countries. *Dental Traumatology*. 2015 Apr;31(2):89-96