

KNOWLEDGE AND USE OF MOUTHGUARDS AMONG UNIVERSITY ATHLETES IN MALAYSIA

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Abstract

Participation in contact sports has been shown to carry a considerable risk of sustaining dental injuries. It is important for athletes to use available preventive gear to protect themselves from these injuries. Aim of the study: To assess the knowledge, habit and preferences of using mouthguards among university athletes. Materials and Method: Self-administered questionnaires, consisting of Part A - Age, gender, type of sporting activities, total hours dedicated to sports training, level of sports representation; Part B - Awareness of risk of dental injuries, knowledge on mouthguards such as definition of a mouthguard, role of mouthguard, use of mouthguards and reasons for not wearing mouthguards; and Part C – Experience of sustaining dental injuries during sports activities, were distributed. Athletes who were university students over 18 years and under 30 years of age and athletes who claimed to know about mouthguards were included in the study. Results: Data of a total of 225 respondents were analysed, consisting of 68% (n=154) male and 32% female (n=71) with the mean age of 21 years old. Only 46% (n=104) knew exactly about mouthguards and its role in the prevention of dental injuries during sports. Thirty seven percent of them (n=84) have used mouthguards and they were mostly in the martial arts group. The mouthguards were usually provided by the management team (62%). Forty percent of the respondents (n=91) claimed to have sustained dental injuries while playing sports and the injuries occurred more frequently in hockey (65.3%), basketball (60%) and soccer (45.2%). Conclusions: The incidence of dental trauma in contact sports shows that the awareness and use of mouthguards must be intensified. Awareness campaigns focusing on dental trauma should be organized to improve the knowledge of athletes.

Keywords: athletes, dental injuries, mouthguards, sports activities.

Introduction

Participants involved in sporting or recreational activities are often susceptible to dental trauma. The literature reports that the percentage of sports-related dental injuries worldwide varies from 20% – 30%. [1], [2], [3] The risk of injuries has been shown to increase with age of the athletes, in contact sports, in competitive matches and higher in athletes who participate regularly in sports with increased number of hours of training. [2], [3] Some of these dental injuries could be fairly minor with scrapes and bruises to the facial soft tissues. However, serious injuries have also been reported, involving numerous specialized tissues such as the enamel, dentine, periodontal ligaments, dental pulp, bone, oral mucosa, and temporomandibular joint structures. [4] When dental trauma occurs, majority of the injuries affects the upper jaw, with the maxillary incisors being the most prone to injury. These injuries may have a detrimental psychological effect on the athletes and their colleagues. [2] In addition, the treatment to save the traumatized tooth is expensive. Appropriate rehabilitation of these injuries often requires extensive dental procedures at very high prices with long term care.

Dental trauma in sports differs from other dental trauma, as it is possible to prevent them with the use of mouthguards. Mouthguards are typically composed of a thermoplastic copolymer and designed to fit over the occlusal surfaces of the maxillary teeth and gingivae. [5] It minimizes the risk of sustaining injuries to the facial hard and soft tissues by providing a resilient, protective surface to distribute and dissipate transmitted forces on impact. Use of mouthguards has been shown to decrease chipping and fracturing of crowns and roots, reduce incidence of jaw fracture, protect the lips, cheeks, gums and toothless space in the athletes' mouth and protect both teeth and soft tissues in those wearing dental appliances such as braces. [5] The reduction of sports-related dental injuries has been documented in various reports in United States after the National Collegiate Athletics Association mandated the use of mouthguards for five sports: boxing, football, ice hockey, men's lacrosse and women's field hockey. [6]

In Malaysia, the current National Sports Policy adopted in 1988 includes an emphasis on "sports for all" and is promoted for its potential impact on the health of Malaysians, the creation of healthy lifestyles, national unity & integration and the important role in creating a base of talent for high performance sport. With this policy, it is expected that the overall percentage of participation in organized sports would increase. Many sport centers were built and sporting events are being organized all over the country at various levels. Amidst all these on-going sport activities, there is a scarcity of data on the prevalence of sports-related dental injuries and the information on the use of mouthguards among athletes. It maybe that it is not yet part of the culture of Malaysian athletes to commonly use protective equipments during sport activities. The aim of this study was to assess the athletes' knowledge, habit and preferences of using mouthguards.

Materials and Methods

The study was based on data obtained through self-administered questionnaires. The study was approved by UKM Faculty of Dentistry Ethical Research Committee. The questionnaire was divided into three parts: Part A – consisting of demographic data such as age, gender, type of sporting activities, total hours dedicated to sport training, level of sport representation, Part B – consisting of questions on awareness of risk of dental injuries, knowledge on mouthguards such as definition of a mouthguard, role of mouthguards, use of mouthguards and reasons for not wearing mouthguards and Part C – consisting of questions on experience in sustaining dental injuries during sports activities. This set of questionnaire was validated and pre-tested before they were distributed to the respondents.

Respondents were chosen from random convenience sampling of athletes who were involved in the inter-university and intra-university annual sports competitions that were held at various arenas in Kuala Lumpur. All respondents must give their written consent before they were given a questionnaire to be answered. We approached all the subjects personally during the sporting events. The data collections were carried out from July to September 2009.

A total of 359 athletes volunteered to answer the questionnaires. Athletes who met the following criteria were included in this study: athletes who were university students over the age of 18 years and under 30 years and athletes who claimed to know what a mouthguard was. After dismissing those who failed to meet such criteria, 225 respondents (62.7%) were selected to be included in the data analysis. The results were evaluated and analysed using SPSS 15.0 for Windows®.

Results

The respondents comprised of 68% male (n=154) and 32% female (n=71) with the mean age of 21 years old. The background details of sport activities for the respondents were detailed in Table 1. Eighty one percent of the respondents (n=182) were aware of the risk of sport activities to their dental health.

Knowledge of Mouthguards

Respondents were asked on what they knew about mouthguards. Eighty six percent (n=194) of the respondents answered, “a mouthguard is something that we wear inside the mouth” and 54.2% (n=122) answered, “made of plastic material”. Only 46% (n=104) respondents correctly responded with both answers. Respondents were asked to choose correct statements about the functions of mouthguards and most respondents (91.6%, n=206) answered, “mouthguards are used to prevent teeth injury” while 57.8% respondents (n=130) answered “to prevent gum and lip injuries”. Half of the respondents (51.6%, n=116) chose both correct statements.

Table 1: Background details of sporting activities of the respondents (N=225)

Items		Number of respondents	Percentage
Types of sport most frequently played	Badminton	10	4.4
	Basketball	10	4.4
	Hockey	26	11.6
	Martial arts	58	25.8
	Netball	7	3.1
	Soccer / futsal	31	13.8
	Rugby	24	10.7
	Athletics	19	8.4
	Others	40	17.8
Total hours dedicated to sport activity per week	Less than 3	59	26.2
	4 to 6	81	36.0
	7 to 9	33	14.7
	More than 10	52	23.1
Level of representation	School	53	23.6
	University	69	30.7
	District	40	17.8
	National	36	16.0
	International	27	12.0

Use of Mouthguards

Only 37% respondents (n=84) had ever worn mouthguards during a sport activity. Details on the sport activities for these respondents are summarized in Table 2. The highest number of respondents who wore mouthguards was in the martial arts group (56%, n=47). Sixty two percent of these respondents (n=52) wore mouthguards that were provided by the management team and 36% respondents (n=30) bought it themselves from retail outlets . Only one person had actually obtained a prescribed mouthguard from a dentist. Most of the respondents who had used mouthguards claimed that they used it only during competitions (85%, n=71), whilst a small number used it at every training and competition (n=4), wore it only when instructed (n=3) and only when it was available (n=1).

Table 2: The pattern of respondents that have experience using mouthguards (n=84)

Features		Experience using mouthguards (n)	Percentage (out of 84 respondents)
Types of sports most frequently played	Badminton	3	3.6
	Basketball	2	2.4
	Hockey	9	10.7
	Martial arts	47	55.9
	Netball	0	0
	Soccer / football	6	7.1
	Rugby	9	10.7
	Athletics	4	4.7
	Others	4	4.7
Total hours dedicated to sports activity per week	Less than 3	15	17.9
	4 to 6	35	41.7
	7 to 9	11	13.0
	More than 10	23	27.4
Level of representation	School	20	23.8
	University	31	36.9
	District	8	9.5
	National	16	19.0
	International	9	10.7
	Others	□	-
Sources	Provided by team's management	52	61.9
	Shared with friends	1	1.2
	Prescribed by dentist	1	1.2
	Bought from retail outlet	30	35.7
Timing of wear	Every time during competition & training	5	6.0
	During competition only	73	86.9
	Rarely wear except instructed	3	3.6
	Only if mouthguard is available	1	1.2
	Others	2	2.3

The respondents who have not used mouthguards (n=141) were asked the reasons for not doing so. The answers are summarized in Table 3.

Table 3: Reasons for not using mouthguards by non-wearers (n=141)

Items	Number of respondents	Percentage
“Have no mouthguard”	50	35.4
“No instruction to wear it”	24	17.0
“Not involved in vigorous sports”	49	35.0
“Do not believe in effectiveness”	1	0.7
“Look weird as others did not wear it”	6	4.3
Others	10	7.1

Frequency of Dental Injuries

Forty percent of the respondents (n=91) claimed to have sustained dental injuries while playing sports. The distribution of the dental injuries in relation to sport activities is summarized in Table 4. These injuries occurred more frequently in hockey (65.3%), basketball (60%) and soccer (45.2%). Types of injuries sustained by these respondents include avulsion, fractured and displaced teeth.

Table 4: Distribution of dental injuries and use of mouthguards according to sport activities

Sports	Total athletes	Athletes Injured	% of Athletes Injured	Mouthguard Use	% of Mouthguard Use
Badminton	10	1	10.0	3	30.0
Basketball	10	6	60.0	2	20.0
Hockey	26	17	65.3	9	34.6
Martial arts	58	18	31.0	47	81.0
Netball	7	3	42.9	0	0
Soccer/futsal	31	14	45.2	6	19.4
Rugby	24	10	41.7	9	37.5
Athletics	19	5	26.3	4	21.1
Other	40	17	42.5	4	10.0
Total	225	91	40.4	84	37.3

Discussion

There is lack of information in the literature on athletes' awareness of the risk of dental trauma in sport activities and their preferred method in preventing dental injuries in Malaysia. This survey aimed to obtain a preliminary overview on the use of mouthguards amongst university athletes in the country and therefore, we approached respondents from different types of sports and from different levels of involvement in sports.

The role of mouthguards in preventing dental injuries during sport activities has long been established.[5] It has been widely accepted as a protective device to decrease the incidence of injuries not only to the dento-alveolar tissues, but also the incidence of concussion.[5] This fact should be made known to all athletes especially those who are involved in contact sports. In some countries such New Zealand, United States of America and Canada, use of mouthguards for athletes in contact sports has been made mandatory.

The present study revealed that athletes' awareness on the risk of sport towards their dental health is high (81%). However, only 46% of these respondents really knew about mouthguards whereby they were able to answer both questions on knowledge of mouthguards correctly. Majority of the respondents in our study (86%) knew that a mouthguard is a protector worn inside the mouth indicating that they have a general idea of what a mouthguard is. The results are similar with the findings from studies carried out in other countries.[1],[2] Most respondents (91%) knew that mouthguards were used to prevent teeth injury but only half (52%) knew that the other function of mouthguards is to prevent gum and lip injuries. These results indicate that the respondents' level of knowledge on mouthguards is somewhat low. The use of mouthguards amongst these athletes was even poorer (23.4%) considering that almost 70% of them were involved in contact sport. Half of the respondents who used mouthguards were involved in martial arts (66%). Most of the respondents who used mouthguards wore it only during competition (87%).

Unfortunately, the prevalence of dental injuries suffered by athletes during sports activities in Malaysia is not known. The only available reports on traumatized teeth was carried out in 12 – 16 year old school children with no mention of the cause of trauma.[7] Prevalence of tooth injuries during sport activities in other countries is at the range of 20 – 30% depending on the type of sports.[1],[2],[3] Based on this fact, it can be assumed that athletes in Malaysia would not be immune to dental injuries during their sporting activities. In this study, 40% of the athletes claimed to have sustained dental injuries while playing sports. The injuries occurred more frequently in vigorous sport activities such as hockey (65.3%), basketball (60%) and soccer (45.2%). Types of injuries sustained by them include avulsion, fractured and displaced teeth. These injuries were not verified by examining their mouth individually. However, it gives an indication to the prevalence of dental injuries among the athletes. With the stated percentage of dental injuries, the low usage of mouthguards amongst Malaysian athletes is indeed worrying and therefore, further action is needed to increase athletes' awareness on the importance of mouthguards.

The strategy to increase awareness in athletes must start with good collaboration amongst the authorities. The Ministry of Education can help by including relevant topics regarding tooth injury prevention and management in the education syllabus such as Physical Education for the young and active age group, the adolescents. In the syllabus for Teacher Trainees in Malaysia, dental injuries are taught as a component of basic knowledge on oral health.[8] This includes the use of

mouthguards during sports and early management of avulsed tooth.[9] This should be reinforced at various levels. Frequent comprehensive public awareness campaigns focusing on dental trauma should be organized, mainly to improve the awareness on the use of mouthguards amongst schoolchildren, teenagers and adults who are active in sports.

In this study, the excuses given for not using mouthguards were “have no mouthguard” (35%), “not involved in vigorous sports” (35%) and “no instruction to wear it” (17%) even though most of them were involved in contact sports. They did not see the necessity of wearing one. To tackle this problem, the doctors from Sports Medicine could advise and instill the knowledge and awareness on using mouthguards to their patients who are involved in relevant high-risk sports activities. The use of mouthguards for the high-risk sports, such as rugby, martial arts and boxing, should be made compulsory in order to play the sports. Adolescents, in particular, could benefit from information and education in the long run so that they do not have negative prejudices towards mouthguards. This would make the players conscious of tooth protection at the beginning of their career and avoid later harm. Dentists or associated organizations could play an important role to promote the custom-made mouthguards to athletes as well as the governing bodies, coaches and schools and also find ways to make the mouthguards more affordable to the public.

This study revealed that the mouthguards worn by the athletes were mostly provided by the sports team’s management (62%) and bought from retail outlets (36%). These mouthguards would probably be Stock or Boil and Bite mouthguards. These two types of mouthguards are usually bulky and lack proper retention and would not be comfortable to the wearers, as they need to be held in place by constant occlusal pressure.[5] These mouthguards are also unsafe as it could be dislodged upon impact to the mouth. However, the Boil and Bite mouthguard is thermoplastic at low temperature, so it could be molded directly in the athlete’s mouth, for proper fitting and better retention. The disadvantage of this type of mouthguard is that it could distort at normal body temperature and whilst biting down during the moulding procedure, the thickness of the material could decrease from 70% to 99%. This makes it inadequate to protect the athletes against an impact to the mandible.[10] Custom-made mouthguards offer better protection than the boil and bite type, as it has a good tooth and tissue adaptation to make it retentive, with negligible deformation even after it has been worn for prolonged periods of time and able to provide enough thickness for protection.[5] This type of mouthguard can be customized to accommodate athletes who are wearing appliances such as orthodontic brackets. But unfortunately, many people do not use them as they are perceived to be expensive and necessitate a visit to the dentist.

Conclusion

This study revealed that although there is awareness on the risk of dental injuries during sports activities, the general knowledge and benefits of using mouthguards among the athletes is still low. Even those who knew about the benefits of mouthguards do not use it regularly despite being involved in contact sport.

References

- [1]. Tulunoglu I, Ozbek M. (2006). Oral trauma, mouthguard awareness and use in two Contact Sports in Turkey. *Dental Traumatology*, 22, 242 □ 246.
- [2]. Ferrari CH, Medeiros JMF. (2002). Dental Trauma and Level of Information: Mouthguard Use In Different Contact Sports. *Dental Traumatology*, 18, 144 □ 147.
- [3]. Levin L, Friedlander LD, Geiger SB. (2003). Dental and Oral Trauma and Mouthguard use during Sport Activities In Israel. *Dental Traumatology*, 19, 237-242
- [4]. Ranalli DN & Demas PN. (2002). Orofacial Injuries from Sport: Preventive Measures for Sports Medicine. *Sports Medicine*, 32(7), 409 □ 418
- [5]. Newsome PRH, Tran DC, Cooke MS. (2001). The Role of The Mouthguard in the Prevention of Sports-Related Dental Injuries: A Review. *International Journal of Paediatric Dentistry*, 11, 396–404
- [6]. Cohenca N, Roges RA & Roges R. (2007). The Incidence and Severity of Dental Trauma in Intercollegiate Athletes. *Journal of American Dental Association*, 138, 1121-1126.
- [7]. Nik-Hussein NN. (2001). Traumatic Injuries to Anterior Teeth Among School children in Malaysia. *Dental Traumatology*, 17, 149 – 152.
- [8]. Oral Health Division, Ministry of Health of Malaysia. Guidelines for Teacher Trainees Programme. http://ohd.moh.gov.my/modules/xt_conteudo/index.php?id=49
- [9]. Oral Health Division, Ministry of Health of Malaysia. (2011). National Oral Health Plan for Malaysia 2011-2020.
- [10]. Hoffmann J, Alfter G, Rudolph NK & Goz G. (1999) Experimental Comparative Study of Various Mouthguards. *Endodontics Dental Traumatology*; 15: 157-1 63.

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