

Original

Dental trauma and mouthguard awareness and use among contact and noncontact athletes in central India

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Abstract: We investigated the associations of mouthguard awareness and use with the rate and type of orofacial trauma during sports activities among professional athletes. In this cross-sectional study of athletes aged 12 to 22 years who trained for participation in national and international competitions, data were collected by using a questionnaire and a clinical examination that included an index of dental injury. There were significant differences in mouthguard awareness and use and injury rates, i.e., athletes who did not wear mouthguards had more injuries. Traumatic injuries to teeth were significantly more frequent among contact athletes (15; 9%) than among noncontact athletes (4; 2.5%). Limited mouthguard awareness could be due to lack of information and education on dental injuries and their prevention. (J Oral Sci 56, 239-243, 2014)

Keywords: mouthguard; orofacial injury; sports dentistry.

Introduction

The word "sport" is derived from a combination of words meaning "to carry away from work". In current usage, sport has come to encompass a wide range of human

activities, skills, and accomplishments that are not part of routine life. Some occupations, such as fishing, can also be performed as sports (1).

Sports dentistry began in the 1980s and focuses on preventing and treating orofacial athletic injuries and related oral diseases (2). The incidence of dental trauma due to contact sports has increased substantially in recent decades. Most cases are injuries to the anterior teeth of teenagers. Many surveys have found that athletes experience a dental injury during participation in sports at least once in their lifetime (3).

An epidemiologic study of dental injuries at the 1989 Canada Games recommended that sports governing bodies and major games organizing committees should be more active in promoting programs to prevent oral injuries and oral disease, including implementing mandatory mouthguard rules, particularly for sports that have a high risk for oral injury (4).

The thousands of hours that athletes spend practicing and competing increases the possibility of orofacial trauma through contact or collision with sports equipments (bats, balls, and sticks), with the bodies of other participants, and with playing surfaces (4). A growing consensus is calling for mouthguard use and for dental professionals to improve the oral health of athletes (5).

Holmes (6) reviewed mouth protection among Scottish athletes and found that, although mouthguards were compulsory in some sports and were often worn by rugby and hockey players, athletes were generally unaware of the need for mouth protection.

No studies have evaluated the oral health status of athletes in Madhya Pradesh, India. Hence, we investi-

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gated the association of mouthguard awareness with the rate and type of orofacial injuries during sporting activities among professional Indian athletes.

Materials and Methods

This cross-sectional study assessed the association of traumatic dental injuries with mouthguard use and awareness among athletes in Bhopal City, India. The study population comprised all active professional athletes from Madhya Pradesh who represented India at the national or international level. The study was conducted for a period of approximately 3 months, from February 2013 through April 2013, at the Department of Sports and Youth Welfare, which is a joint venture of the governments of India and Madhya Pradesh.

We conducted a preliminary test of 25 contact athletes and 25 noncontact athletes, to assess the validity and accuracy of the predesigned survey, examiner reliability, and practical and communication difficulties in examining the oral cavity in this population. The weighted kappa for intra-examiner reliability was 91% on the Ellis and Davey’s classification of tooth injuries.

Permission to conduct the study was obtained from the Director of the Sports Department for Sports Youth and Welfare, Bhopal. Prior consent was obtained from all study participants. Ethical clearance for the study was obtained from the Ethics Committee of the People’s College of Dental Sciences and Research Centre, Bhopal (PCDS/Acad/09-10/524).

Inclusion and exclusion criteria

We enrolled athletes who were training for participation in competitions and gave informed consent to participate in the study during the study period. Athletes who did not give consent to participate in the study were excluded.

Sample size

The Department of Sports and Youth Welfare provided a list of athletes enrolled at the stadium. Among a total of 345 athletes, 320 participated in the study. The study participants were 12 to 22 years of age and resided in both residential and nonresidential sports complexes.

Survey and method of data collection

Information on demographic characteristics and oral health behaviors, such as history of soft or hard tissue injury and mouthguard use, was collected by means of a personal interview administered by the examiner. The dental team comprised an examiner and an assistant for recording data.

Each athlete received a thorough interview followed

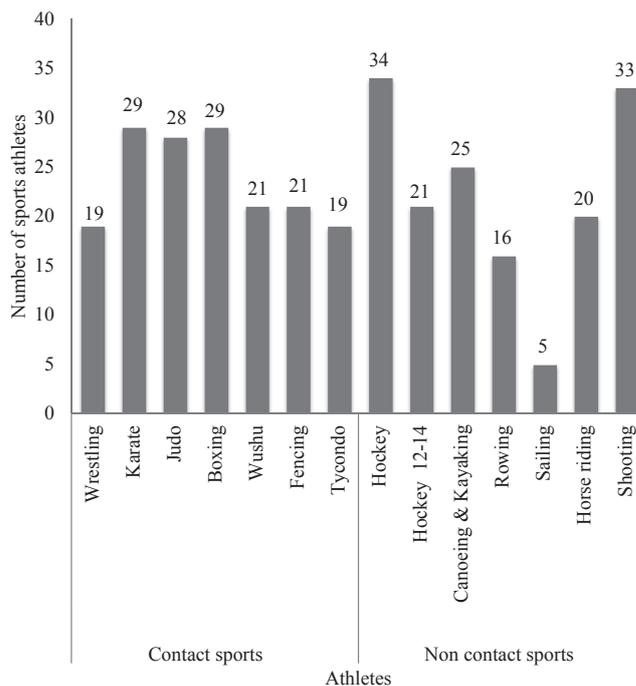


Fig. 1 Distribution of sports played by participants

by a type III clinical examination. The Ellis and Davey’s classification of tooth injuries was used to assess dental fractures.

Statistical analysis

The Statistical package for the social sciences, version 17 was used for all statistical analysis. The chi-square test was used to determine statistical significance, which was defined as a *P* value of less than 0.05.

Results

In total, 320 athletes (age, 12-22 years) were included in the study (Fig. 1). The participants were divided into two age groups: 12-17 years and 18-22 years. There were 213 (68.4%) males and 107 (35%) females. The age and sex distributions of the participants are shown in Table 1.

Analysis of orofacial injury among the athletes showed statistically significant differences in rates of injury to front teeth (20.4% in contact athletes vs. 24.6% in noncontact athletes) and soft tissue (25.9% in contact athletes vs. 14.2% in noncontact athletes). Sixty-five (39.1%) contact athletes and 39 (25.3%) noncontact athletes reported that the reason for injury was sports activity, which was a statistically significant difference. Overall, tooth injuries were more common among contact athletes (31; 18.6%) than among noncontact athletes (23; 15%) (Table 2).

Awareness of the need for mouthguards was higher in contact athletes (112; 67.5%) than in noncontact athletes

Table 1 Age and sex distribution of participants

Age (years)	Sex		Total, no. (%)	Chi-square	P value
	Male, no. (%)	Female, no. (%)			
12-17	113 (64.2)	63 (35.7)	176 (53.7)	3.50 {df = 3}	0.17
18-22	100 (69.4)	44 (30.5)	144 (45.0)		
Total	213 (66.5)	107 (33.4)	320 (100.0)		

df, degrees of freedom

Table 2 Self-reported orofacial injury among participants, by type of sport

Variables		Contact sport, no. (%)	Noncontact sport, no. (%)	Chi-square	P value
Type of orofacial injury	Front tooth injury	34 (20.4)	38 (24.6)	6.70 {df = 2}	0.03
	Soft tissue injury	43 (25.9)	22 (14.2)		
	None	89 (53.6)	94 (29.3)		
Cause	Sports	65 (39.1)	39 (25.3)	6.90 {df = 1}	0.00
	Other activity	12 (7.2)	21 (13.6)		
Treatment	Dental visit	34 (20.4)	20 (13.0)	1.90 {df = 2}	0.30
	Home treatment	16 (9.6)	17 (11.0)		
	None	27 (16.2)	23 (14.9)		

df, degrees of freedom

Table 3 Awareness and use of mouthguards among participants, by type of sport

Variables		Contact sports, no. (%)	Noncontact sports, no. (%)	Chi-square	P value
Do you know about mouthguards?					
	Yes	112 (67.5)	53 (34.4)	36.38 {df = 2}	0.00
	No	43 (25.9)	71 (46.1)		
	Don't know	11 (6.6)	30 (19.5)		
Do you wear a mouthguard?					
	Yes	68 (41.0)	12 (7.8)	46.80 {df = 1}	0.00
	No	98 (59.0)	142 (92.2)		
Reason for not wearing mouthguard					
	Communication problem	3 (1.8)	4 (2.6)	53.10 {df = 4}	0.00
	Impedes breathing	5 (3.0)	18 (11.7)		
	Looks unattractive	22 (13.3)	10 (6.5)		
	Limits performance	48 (28.9)	25 (16.2)		
	Other reason (not required)	20 (12)	85 (55.2)		

df, degrees of freedom

(53; 34.4%), and 68 (41%) contact athletes and 12 (7.8%) noncontact athletes reported wearing mouthguards. The most frequently reported reason for not wearing a mouthguard was a perceived reduction in athletic performance, among contact athletes (48; 28.9%), and the fact that mouthguard use was not mandatory, in noncontact athletes (85; 55.2%). The above differences were all statistically significant ($P < 0.05$ for all comparisons; Table 3).

There was a significant difference between awareness of the need for mouthguards and use of mouthguards: overall, 165 (51.5%) athletes were aware of mouthguards, but only 67 (21%) wore them (Table 4).

Mouthguards were worn by 80 (25%) athletes, among whom 25 (7.8%) had an injury to the front teeth, 23 (7.1%)

had a soft tissue injury, and 32 (10%) had no injury. In contrast, 240 (75%) athletes did not wear a mouthguard, among whom 47 (14.6%) had an injury to the front teeth, 42 (13.1%) had a soft tissue injury, and 151 (47.1%) had no injury. There were significant differences between these groups in awareness of mouthguard and injury history, i.e., those who do not wear mouthguards had more injuries (Table 5).

Discussion

Sports are a common cause of dental and orofacial injuries, and dental accidents often have lifelong consequences. These complications can be avoided with adequate educational and preventive measures, such as use of mouthguards, especially in activities that increase

Table 4 Association between mouthguard awareness and use

Question	Variable	Do you wear a mouthguard?			Chi-square	P value
		Yes, no. (%)	No, no. (%)	Total, no. (%)		
Do you know about mouthguards?						
	Yes	67 (21)	98 (30.6)	165 (51.5)	44.30 {df = 2}	0.00
	No	9 (2.8)	105 (32.8)	114 (35.6)		
	Don't know	4 (1)	37 (11.5)	41 (12.8)		
	Total	80 (25)	240 (75)	320 (100)		

df, degrees of freedom

Table 5 Association between mouthguard use and injury

Question	Injury experience, no. (%)				Chi-square	P value
	Front tooth injury	Soft tissue injury	No injury	Total		
Do you wear a mouthguard?						
	Yes	25 (7.8)	23 (7.1)	32 (10)	12.80 {df = 2}	0.00
	No	47 (14.6)	42 (13.1)	151 (47.1)		
	Total	72 (22.5)	65 (20.3)	183 (57.1)		

df, degrees of freedom

the risks of blows and falls. The World Dental Federation recommends that national dental associations inform the public and oral healthcare professionals of the benefits of sports mouthguards (7).

In the present study, the prevalence of orofacial injuries during sporting activities was 39.1% in contact athletes and 25.3% in noncontact athletes. Similar findings were reported among Japanese students in 1998: 43% of the students sustained orofacial injuries during sportspractices (8).

The results of our study differ from those of studies conducted in Brazil, Israel, and Birmingham, England, where the prevalence of orofacial injuries was 28.8%, 27%, and 12% respectively. Our prevalence might have been higher because of the limited use of mouthguards (9-11).

Our results confirm that mouthguards protect dental and periodontal structures during contact sports. The rate of orofacial injuries was significantly higher among athletes who did not use mouthguards, which was also the case in a study conducted in Israel (11). The fact that most of the present athletes claimed knowledge or awareness of mouthguards yet did not use them supports the findings of similar previous studies (9,12).

The present rate of orofacial injuries was high among contact athletes, despite their high levels of mouthguard awareness (67.5%) and use (41%). Very few noncontact athletes (7.8%) wore mouthguards, even though their level of awareness was not low (34.4%); therefore, their rate of orofacial injuries was high in relation to the risk exposure. Previous studies showed enormous discrepancies in the awareness that mouthguard use prevents orofacial injuries. The reported rates of such awareness in

other countries were 100% in Germany and Switzerland, 81.9% in Japan, 52.4% in Brazil, 27% in Israel, 82.8% in Nigeria, 44.1% in Turkey (8,10-14). With the support of dentists and public health professionals, the risks of orofacial injury should be made known to athletes, parents, coaches, and school and college officials. Coaches and teachers should be encouraged to insist that players wear mouthguards during training and matches. Sports governing bodies and major games organizing committees should work with dental hospitals and colleges in taking a more active role in promoting programs to prevent oral injury and disease and in requiring mandatory mouthguard use. Dental hospitals and dental supply companies can make mouthguards easily accessible. Use of helmets with mandibular extensions should also be promoted. Athletes, especially children, should change mouthguards annually because of growth changes in their mouth and jaws.

Sports behavior and injuries are areas of growing concern in public health dentistry. The incidence of orofacial injuries is high among athletes, particularly those participating in contact sports. This is most likely due to insufficient knowledge of the benefits of mouthguards and limited use of mouthguards, which should be addressed by providing more information regarding dental injuries and their prevention. The present participants had no exposure to such an educational or prevention program.

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