

SECONDARY SCHOOL ATHLETES: A STUDY OF MOUTHGUARDS

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The purpose of this study was to determine the extent of mouthguard awareness and use, as well as the amount and type of oro-facial trauma associated with and without mouthguard wear in adolescent Nigerian athletes.

A 13-item self-completion questionnaire was completed and returned by 1,127 secondary school athletes (completion rate of 93.9%) comprising 683 (60.6%) males and 444 (39.4%) females ranging in age from 12- to 19 years (mean age 15.18±2.97 SD). The athletes were randomly drawn from 23 secondary schools located in different parts of Ibadan city in Nigeria.

Sixty-five-and-a-third percent of the athletes professed awareness of the need for mouthguards for sports, but only 19.6% claimed usage of the device. Thirty-four-and-a-half percent of the athletes reported having sustained one form of oro-facial injury or the other previously. The prevalence of oro-facial injuries was significantly lower while wearing a mouthguard ($p < 0.05$), and most of the injuries occurred during contact sports.

The study supports the need for the enforcement of mandatory mouthguard use in contact sports. (*J Natl Med Assoc.* 2004;96:240–245.)

Key words: mouthguards ♦ secondary school athletes ♦ Ibadan, Nigeria

INTRODUCTION

Sports-related dental trauma remains a risk for children and adolescents, and the management of such patients often calls for the attention of pediatric dentists and orthodontists. Though the use of mouth protectors (mouthguards) has been advocated for more than 33 years and the athletic communities of various countries have started to appreciate their usefulness, there is no available literature on this subject of growing importance in Nigeria.

Ibadan is the capital city of Oyo State and the largest town in the southern Sahara. It has a long history of active interest in sports generally and has

the privilege of hosting the first stadium in Nigeria (Liberty Stadium), which was opened on September 30, 1960.¹ This is not unconnected with the fact that Ibadan was one of the first cities in Nigeria that received the western civilization from her colonial masters (Britain).

There is clear support in the scientific literature for the use of mouthguards in contact sports.²⁻⁴ Moreover, there is evidence that mouthguards are effective in protecting against concussions and injuries to the cervical spine.⁴⁻⁷

Globally, sports are becoming more attractive to children, adolescents, and young adults. The reasons are obvious—ranging from financial rewards received by the athletes to the political importance and glory received by the participating countries. However, the incidence of oro-facial injuries associated with sports, especially contact sports, has been reported for different communities as ranging from 32.3% for soccer athletes to 56.5% for rugby athletes,⁸ 27.6% in soccer, 55.4% in basketball, and 72.3% in wrestling.⁹ At the time of this report, the only study¹⁰ on sports-related maxillofacial frac-

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Table 1. Age and Gender Distribution of the Subjects

Age Group (Years)	Frequency				Total	
	Males		Females		n	%
	n	%	n	%		
12-15	389	59.0	270	41.0	659	58.5
16-19	294	62.8	174	37.2	468	41.5
Total	683	60.6	444	39.4	1127	100.0

tures in Nigerian patients reported a prevalence of 5.4%. With the increasing interest in sports, the incidence of sports-related oro-facial injuries is likely to increase which therefore calls for more emphasis on preventive measures especially in developing countries like Nigeria where cost of treatment of dental injuries is relatively high due to poor funding of the health care system. Moreover, in young athletes, the potentially disfiguring dental injuries deserve adequate preventive measures.

There is a strong support among players and researchers for mouthguard wearing to be made compulsory.⁴ It is generally recommended that:⁴

1. Mouthguards be worn during both practice sessions and games
2. The habit of wearing a mouthguard should begin at an early age
3. Mouthguards be regularly replaced while children are still growing
4. Adult players replace their mouthguards at least every two years.

In the United States, for example, with the introduction in 1962 of mandatory use of a face mask and mouth protector for all high school and collegiate football participants by the National Alliance Football Rules Committee¹¹ and the National Collegiate Athletic Association later passing a similar rule, the incidence of facial and dental injury per 100 players reportedly decreased from 2.26% prior to mandatory face masks and mouthguards usage to 0.3% in 1966². However, previous reports¹²⁻¹⁴ in Nigeria on trauma to the permanent incisors (though not strictly sports-related) consistently gave increasing prevalences of traumatic injuries to the maxillary incisors as 14.5%, 15.9%, and 19.1%, respectively. Meanwhile, it has been shown that individuals who take part in contact sports and those who have an increased overjet and inadequate lip coverage have an increased prevalence and tend to be more severe.^{1,15-19}

The purpose of this study was to determine the

extent of mouthguard awareness and use, as well as the amount and type of oral trauma associated with and without mouthguard wear during sports among secondary school athletes in Ibadan, Nigeria.

MATERIALS AND METHODS

This survey was part of an effort to create awareness concerning mouthguard use in sports in Ibadan, Nigeria, initiated by the author.

A 13-item (besides demographic characteristics such as age, gender, name of school) questionnaire was constructed and copies distributed to 1,200 secondary school students in 23 schools randomly selected from different parts of Ibadan city. The study was conducted between May and June 2002. One-thousand-one hundred-twenty-seven students—683 (60.6%) males and 444 (39.4%) females—ranging in age from 12 to 19 years (mean age 15.18±2.97 SD) completed and returned the forms. The consent of the subjects to participate in the study was earlier sought and received after the approval to conduct the study was received from the appropriate school authority.

The self-completion questionnaire sought information concerning each athlete's use of mouthguards and any history of oral trauma while participating in sports. Positive responses to previous trauma were qualified concerning the type and location of the injury, the sport during which the injury occurred, and whether the athlete was wearing a mouthguard at the time of injury.

Statistical Analysis

Descriptive statistics, such as mean age and standard deviation, were done. The data was also analyzed using chi-square statistic for significance of observed differences and test of association, accepting $p < 0.05$ as significant. All the analyses were done using the statistical package for social sciences (SPSS for Windows).

Table 2. Distribution of the Subjects According to Sports

Sport	Frequency	Percent
Football (soccer)	631	56.0
Basketball	92	8.2
Taekwondo	2	0.2
Judo	6	0.5
Table tennis	61	5.4
Long tennis	2	0.2
Badminton	3	0.3
Lawn Tennis	42	3.7
Hand ball	21	1.9
Swimming	10	0.9
Gymnastics	8	0.7
Boxing	16	1.4
Volleyball	21	1.9
Hockey	5	0.4
Snookers	1	0.1
*Field events	150	13.3
General sports	56	5.0
Total	1127	100

*Field events here included long jump, high jump, javelin, discus, shotput, golf, etc.)

RESULTS

In this survey, the 1,127 adolescent athletes who completed and returned the questionnaires gave a completion rate of 93.9%. Table 1 shows the age and gender distribution of the athletes, with more boys than girls involved in sports.

Table 2 gives the distribution of these adolescent athletes according to sports with football (soccer) having the highest frequency of 631 (56.0%). Field events accounted for 150 (13.3%) of the sports and basketball athletes, followed with 92 (8.2%).

Figure 1 shows that distribution of the oro-facial injuries and concussions sustained according to the type of sporting activities (contact or noncontact sports). Contact sports accounted for 77.6% of the oral injuries, while 22.4% was due to noncontact sports.

Distribution of the types of oral injuries with and without mouthguards during the time of the sports injuries is shown in Table 3. The prevalence

of oral injuries was significantly lower while wearing mouthguards ($p < 0.05$).

In all, 736 (65.3%) of the athletes claimed they know what "mouthguard" means, while 391 (34.7%) were unaware. However, only 221 (19.6%, of which more were boys than girls) claimed they use mouthguards for sports. The relationship between knowledge about mouthguards and the usage in sports by the athletes is shown in Table 4. Statistically, more athletes who knew about mouthguards were not using them for sports ($p < 0.01$).

Six-hundred-seventy-two (59.6%) of the athletes believed that the wearing of mouthguards during sporting activities would reduce the chances of sustaining oral injuries, while the remaining 455 (40.4%) felt otherwise.

Two-hundred-six (18.3%) claimed knowledge of the three types of mouthguards, while the remaining majority (81.7%) confessed ignorance. Of those 206 athletes, 120 (58.4%) claimed cost would be the determining factor on the type of mouthguard to use, 35 (16.9%) would base their choices on the convenience of the appliance types, while 51 (24.7%) would consider the quality and degree of oral protection of the appliance.

DISCUSSION

Because some sports (e.g., rugby, football) become progressively rougher during the teenage years, the use of mouthguards by these children should be encouraged; their value in protecting children playing American football has been shown.^{20,21} The different functions of mouthguards have equally been described by Stevens.²²

The present study has shown that football (soccer), which is a contact sport with mandatory mouthguard use in other advanced countries like the United States, is a major sport in which these Nigerian adolescents are involved. This sport, which is growing in its global interest and passion, deserves mandatory legislation for its participants to wear some form of mouth protector, especially among adolescents due to their energetic nature and tendency to be rough during games. Basketball, which is another contact sport, also scored high among the sporting activities of these adolescents. This study has revealed that contact sports accounted for over two-thirds of the oral injuries reported by the respondents. The prevalence of oral injuries noted in this study is much higher than that reported by McNutt et al.²

The pattern of oral injuries as noted in this study

Injury	Without Mouthguard		With Mouthguard		Total	
	n	%	n	%	n	%
Laceration	73	54.9	60	45.1	133	34.2
Fracture of teeth	24	53.3	21	46.7	45	11.6
Loosening of teeth	24	66.7	12	33.3	36	9.2
Blood collection under gum (Hematomas)	67	62.6	40	37.4	107	27.5
Multiple injuries	52	76.5	16	23.5	68	17.5
Total	240	61.7	149	38.3	389	100.0

$\chi^2=10.63676$, $df=4$, $p<0.05$ (Statistically significant differences)

is different from that reported by McNutt et al.² and Davies et al.,²³ in which most of the oral injuries were recorded among other sports. This observed difference in the pattern could be explained by the introduction and enforcement of mandatory mouthguard wear during contact sports in these countries unlike Nigeria. In fact, McNutt et al.² reported that it was apparent that oral injury had been reduced in football due to the mandatory enforcement of mouthguard use. It suggests also that the dental profession in Nigeria will need to do more in sensitizing the government and the relevant bodies of the need to enforce mandatory mouthguards use during sports, especially in contact sports. More than half of the oral injuries reported by McNutt et al.² were sustained in other sports outside football due to the mandatory enforcement of mouthguards wear in football. In the present Nigerian study, close to one-third of the oral injuries was accounted for by other noncontact sports. It seems there is the need while educating athletes, sports-related bodies, and governments on the risks of involvement in contact sports without mouthguards, to also let them know of the potential for oral injuries these other sports have.

This study also revealed that boys significantly had more oral injuries than girls which corroborates the studies done by Uitenbroek²⁴ and Williams et al.²⁵ Equally interesting was that this study has shown that more boys than girls claimed using mouthguards, which supports the report of Rodd et al.²⁶ It has also been reported that parents were more likely to require mouthguards for their sons than daughters.²⁷ This, therefore, suggests a need to pay attention to parents as well as the girls while

Table 4. Relationship Between Knowledge of Mouthguard and Its Usage in Sports by the Athletes

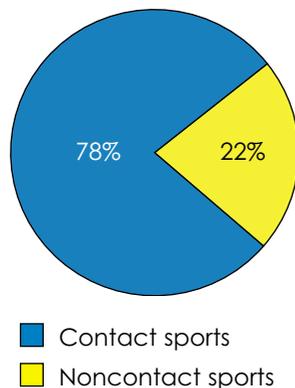
	Use of Mouthguard in Sports		
	Yes	No	Total
Knowledge of mouthguard	187 (25.4)	549 (74.6)	736 (65.3)
Chi-square (χ^2)=45.23896*; $df=1$; * $p<0.01$ (Statistically significant) (Percentages are in parentheses)			

advocating the use of mouthguards in sports.

The finding in this study that statistically more athletes who did not wear mouthguards sustained more oro-facial injuries than those who did agrees with the finding of McNutt et al.² This study did not show a positive relationship between claimed knowledge of mouthguard and use in sports, as significantly more athletes who claimed knowledge about mouthguards were not wearing them for sports. This could possibly explain why there was a high prevalence of oral injuries even among those who claimed using mouthguards during sports. The results of this present Nigerian study suggest the need to further educate these young amateur athletes on mouthguards for effective protective services. Also, a low proportion of subjects claimed having knowledge of the three types of the appliance, while the majority confessed ignorance. This will help them to make informed decision on the type to buy as over half of them indicated to base their choices on the cheapness of the appliance.

This study did not investigate the composition,

Figure 1. Distribution of the Oral Injuries According to Sporting Activities (Contact and Noncontact Sports)



Contact sports: football (soccer), basketball, taekwondo, volleyball, judo, handball, and boxing.

Noncontact sports: table tennis, long tennis, lawn tennis, long jump, high jump, and gymnastics.

design, fabrication, and adaptation of the mouthguards claimed to have been used by these athletes, which could affect the effectiveness of the protective device. However, although understandably more expensive, type-III (custom-fabricated) mouthguards are the most satisfactory in terms of acceptability and comfort to the athlete, but there is no evidence that they are more effective in preventing injuries.²⁸⁻³⁰

CONCLUSIONS

The percentages of the Nigerian athletes who professed awareness of the need to use mouthguards and believed in their protective abilities were far more than those who claimed using these devices in sports. As would be expected, statistically more of these athletes who did not use mouthguards sustained oro-facial injuries than those who claimed wearing the appliances. Contact sports accounted for most of the oro-facial injuries, and statistically more males sustained oro-facial injuries than females.

RECOMMENDATIONS

In view of the above findings and the increasing global interest in sports with the expected increase in number of children, adolescents and young adults getting involved in contact sports, the following recommendations seem relevant:

1. Increased education on mouthguards (including types, design, material composition, and fabrication) should be encouraged at least among young athletes in the developing countries like Nigeria where such awareness is still poor.

2. The world sports-governing body should go beyond mere recommendation of mouthguards in contact sports and enforce use of such devices so as to protect the oral health of these athletes, especially children and adolescents. This will at least give some impetus to the athletic communities of different countries, like the third-world nations, to enforce such rules.

3. The Federation Dentaire International (FDI) in collaboration with the World Health Organization (WHO) should do more to ensure that these children, adolescents, and young adults benefit from our professional input in this regard.

4. Sports journals, magazines, and newspapers should provide effective messages to these athletes concerning the need to wear mouthguards for contact sports, while electronic score boards can be helpful in getting across the message to parents who are likely to be among the spectators.

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