# Mouthguard utilization rates during sport activities in Ankara, Turkey

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Abstract - The objective of this study was to determine the attitudes towards mouthguard use in Ankara, Turkey. In the first part of this study, an eight-item questionnaire was distributed to 22 coaches from 15 secondary schools randomly selected from five municipalities of Ankara, Turkey. The questionnaire sought information on how much coaches know regarding mouthguards and how often children and adolescents of the ages 11-18 use mouthguards. The second part of the study was based on the data obtained from direct interviews answered by 121 university athletes of three different sport modalities (football, ice hockey and martial arts). The purpose of this part of the study was to determine the rate of mouthguard use and the frequency and type of oral trauma in these athletes. The result of the coaches' questionnaires revealed that; none of the 11–18 years old children and adolescents used mouthguards while participating in sports. Of the coaches, 77.2% had seen orofacial trauma in this age group during sport activities and 95.5% of the coaches believed that mouthguards prevented oral injuries. Of the coaches, 72.7% reported that children and adolescents should use mouthguards in sport activities. The second part of the study showed that although all of the athletes owned mouth-formed type of mouthguards, the utilization rate was 74.4%. Of all players, 13.2% had suffered from one or more form of oral injury while not wearing mouthguards. The results show that in Turkey, the use of mouthguards has not become widespread in sports. It can be concluded that regular mouthguard use in sports should be encouraged in Turkey.

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All sport activities carry a certain risk of orofacial injury due to falls, collisions and contact with hard surfaces (1, 2). Pinkham and Kohn (3) mention that growth is a factor for injury risk in adolescents because the developing child needs to adjust newly earned skills to the changing dimensions of his or her body. School children may be at increased risk because of their inability to systematically scan their environment and interpret this information for their bodies to use. Growth is expressed first in long bones, then in the muscles, which leads to a loss in flexibility. This loss may be why sports participation is the most frequent cause of injuries in adolescents.

The increasing popularity of all sporting events results in an increased potential for injuries across a wide range of both organized and unorganized sports (4, 5). Dental injuries are the most common type of orofacial injuries sustained during sports activities (6). Athletic mouthguards were used extensively for the prevention of intraoral trauma in sports (7–9). Josell and Abrams (10) report that mouthguards may help prevent concussion, cerebral hemorrhage, and possibly death, by separating the

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jaws, and thus preventing the mandibular condyles from being displaced upwards and backward against the wall of the glenoid fossa. Other protective roles of mouthguards are:

- **1** Preventing the tongue, lips and cheeks from laceration against the teeth.
- **2** Lessening the risk of injury to anterior teeth following a frontal blow.
- **3** Lessening the risk to posterior teeth of either jaw (11).

While protecting against injuries, mouthguards may have disadvantages:

- **1** Comfort: they may be uncomfortable because of improper fit.
- **2** Tissue reaction: because of either improper fit or as a result of a traumatic blow to the oral cavity, there can be tissue reactions. But the severity of the injury may be even worse without a mouth-guard in place.
- **3** Function and maintenance: it can impair normal breathing and normal speech, or restrict the intake of fluids (7).

Despite growing evidence in favor of the importance of mouthguards in injury prevention, agreement to its recommended mandatory use in sports is not universal. Attitudes of coaches, officials, parents and players toward wearing mouthguards influence their usage. Studies reveal that coaches are the individuals with the highest impact on whether or not players wear mouthguards (12, 13).

The objective of the first part of this study was to assess the perceptions of secondary school sports coaches as regards orofacial injuries and mouth protector usage in sports by adolescent athletes. The results show that none of the students of these Turkish coaches use mouthguards during sport activities.

In this regard it was decided that a second study should be conducted with university students who are professional athletes in sports where mouthguard usage is mandatory. The purpose of this part of the study was to determine the extent of mouthguard use, as well as the frequency of oral trauma in these athletes.

# Methods

# Part one

The first part of the study consisted of 22 coaches; 12 males and 10 females with 9–32 years of experience as a coach (the mean experience was 18.7 years) from 15 secondary schools randomly selected from five municipalities of Ankara, Turkey. Distribution of the sports and the coaches shown in Table 1 reveals that volleyball (40.9%) had the highest number of coaches followed by

Sports	Number of coaches	Percentage
Volleyball	9	40.9
Handball	4	18.2
Basketball	3	13.6
Soccer	3	13.6
Table tennis	1	4.5
Athletics	1	4.5
Physical education	1	4.5
Total	22	100.0

handball (18.2%), soccer (13.6%) and basketball (13.6%).

An eight-item, self-completion questionnaire was distributed to these coaches. Table 2 represents the questions of the coaches' questionnaire which was developed with input from our department, as well as data from previous surveys [McNutt et al. (14), Onyeaso and Adegbesan (4)]. The questionnaire sought information about what sport(s) they coached, the experience they had as a coach, the rate of oral traumas they had seen in children and adolescents aged between 11 and 18 during sport activities, if they believed that mouthguards should be used by athletes in this age group, in what sports they required the participants to wear mouthguards. They were also asked if any of their students used mouthguards, if they felt that mouthguards prevented oral injuries and if they would like to have more information on mouthguards and their types. All of the coaches participating in the study completed the questionnaire.

#### Table 2. Coaches' questionnaire

Name:	
Surname	):
School:	
1. What	S

- What sport(s) do you coach?
- 2. What is your experience as a coach?
- 3. Have you ever seen any oral traumas in 11–18 ages of children and adolescents during sport activities?

4. Do you believe that mouthguards should be used by these age group athletes?

- 🗌 No
- 5. In what sports do you think that participants require wearing mouthguards?
- 6. Do any of your students use mouthguard?
- 🗌 Yes
- $\Box$  No 7. Do you feel that mouthguards prevent oral injuries?
- ☐ Yes
- 8. Would you like to have more information about mouthguards and its types?

🗌 Yes

🗌 No

<sup>□</sup> Yes □ No

<sup>🗌</sup> Yes

# Part two

In the second part of the study, interviews were conducted with 121 university students who were on the football, ice hockey or karate teams of various universities. Ninety-two percent of them were males and 8% were females with a mean age of 20.8 years. The survey was conducted on the teams whose coaches agreed to assist with it. The distribution of the athletes and the sports is shown in Table 3.

Table 4 represents the athletes' questionnaire. Each player was asked a series of questions concerning the type of sport practiced, his/her awareness and use of mouthguard, the type of mouthguard owned and any history of oral trauma while participating in sports. Positive responses to prior trauma were qualified concerning the type and location of the injury and whether the athlete was wearing a mouthguard at the time of the injury. The athletes were also asked if they had any complaints while using the mouthguard. The participants' use

Table 3. Distribution of sports and athletes

	(	Sex	
Sports	Males	Females	Total [ <i>n</i> (%)]
Football	69	0	69 (57.0)
Martial arts	12	10	22 (18.2)
Ice hockey	30	0	30 (24.8)
Total	111	10	121 (100.0)

Table 4.	Questions	from	the	athletes'	interview
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Surname: Age: 1. What sports do you participate?
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1. What sports do you participate?
2. Do you wear a mouthguard?
☐ Yes
─ No
3. If yes, which type of mouthguard do you own?
☐ Stock
── Mouth-formed
Custom-fabricated
4. If you have a mouthquard when do you use it?
Games only
Games and exercises
5. Have you suffered any kind of dental trauma during sport activities
What kind of?
∏Yes
No
6. If you had, were you wearing a mouthquard at that time?
∏Yes
7. Do you have any complaints while using a mouthquard? What kind of
□Speech
Breathing
Drv mouth
Bad taste and odor

□ Other .....

of mouthguard during games and exercises was also evaluated.

#### Results

#### Part one

The coaches ranged in 9–32 years of experience as a coach and a mean experience of 18.7 years. The results of the coaches' questionnaire are given in Table 5. Of the coaches, 77.2% had seen orofacial injuries in 11-18 years aged children and adolescents. Of the coaches, 72.2% believed that mouthguards should be worn by athletes in this age group. The coaches' responses to the question as to which sports require the use of a mouthguard is shown in Fig. 1. Of the coaches, 95.5% felt that mouthguards prevented orofacial injuries. In this study, none of the students used a mouthguard as stated by the coaches. Also, 95.5% of the coaches said they would like more information on mouthguards while 4.5% claimed that they did not need any.

Table 5. Answer key of the coaches' questionnaire

	r	1 (%)
The sports they coached		
Volleyball	9	(40.9)
Handball	4	(18.2)
Basketball	3	(13.6)
Soccer	3	(13.6)
Others	3	(13.7)
The rate of oral traumas reported		` '
Yes	17	(77.2)
No	5	(22.8)
Answers to the question 'Should these age group athletes use mouthguard?'		. ,
Yes	16	(72.7)
No	6	(27.3)
Sports requiring the use of mouthguard <sup>a</sup>		
Handball	10	(28)
Boxing	7	(20)
Basketball	6	(17)
Martial arts	6	(17)
Soccer	3	(9)
Swimming	1	(3)
Athletics	1	(3)
All sports	1	(3)
The rate of students using a mouthguard stated by the coact	hes	
Yes	0	(0)
No	22	(100)
The rate of coaches believing mouthguards prevent oro-facial	injuri	ies
Yes	21	(95.5)
No	1	(4.5)
The rate of coaches influencing their students to use a mout	hguar	d
Yes	0	(0)
No	22	(100)
The rate of coaches wanting more information about mouthg	uards	
Yes	21	(95.5)
No	1	(4.5)

<sup>a</sup>Multiple responses permitted.



Fig. 1. Sports requiring the use of mouthguards according to the coaches.

#### Part two

In the second part of the study interviews were conducted with 121 university students on football, ice hockey and karate teams. Table 6 represents the answers of the athletes' interview. The utilization rate of mouthguards in this study group was 74.4%. Table 7 shows the relationship between the sports and awareness demonstrated regarding the use of mouthguards.

The participants' awareness of the use of mouthguards during games and exercises was also evaluated. Table 8 shows the usage of mouthguards by the athletes (who claimed to use a mouthguard) during games and/or practices. Among the 90 athletes using a mouthguard, 66 (73.3%) of them said they used it regularly during practices as well as

Table 6. Distribution of the athletes' answers to the interview

	n (%)
The sports participated	
Football	69 (57)
Martial arts	22 (18.2
Ice hockey	30 (24.8
The rate of using mouthguard	
Yes	90 (74.4
No	31 (25.6
Type of mouthguard worn	
Stock	0 (0)
Mouth-formed	90 (100)
Custom-fabricated	0 (0)
Frequency of mouthguard wear	
Games only	24 (26.7
Games and exercises	66 (73.3
The rate of dental trauma	
Yes	16 (13.2
No	105 (86.8
The complaints about mouthquards <sup>a</sup>	,
Speech	52 (47.3
Breathing	19 (17.3
Dry mouth	18 (16.4
Others	21 (19)

<sup>a</sup>Multiple answers permitted.

Table 7. Awareness of usage of mouthguards in relation to the sport practiced

Participants ( <i>n</i> )	Users of mouthguard [n (%)]
69	65 (94.2)
22	20 (90.9)
30	5 (16.6)
121	90 (74.4)
	Participants ( <i>n</i> ) 69 22 30 121

Table 8. The usage of mouthguards during games and exercises

Sport	All times (games and exercises)	Games only	Total
Football Martial arts Ice hockey	52 (80.0) 12 (60.0) 2 (40.0)	13 (20.0) 8 (40.0) 3 (60.0)	65 (72.2) 20 (22.2) 5 (5.6)
Total	66 (73.3)	24 (26.7)	90 (100.0)

Values are given as n (%).

Table 9. Problems associated with using mouthguards

Type of the problem	No. of athletes (%)
Speech	52 (47.3)
Breathing	19 (17.3)
Dry mouth	18 (16.4)
Bad taste and odor	11 (10.0)
Nausea	4 (3.6)
Chapped and cracked lips	3 (2.7)
Hypersalivation	3 (2.7)
Total	110 (100.0)

Some athletes stated multiple problems.

games. Twenty-four (26.7%) of those athletes used a mouthguard only in games. The athletes were asked which type of mouthguard they owned. All the athletes owned mouth-formed (boil- and-bite) mouthguard. None of them had used a custommade mouthguard.

Of all players, 13.2% percent reported to having sustained some form of orofacial injury previously. All the injuries happened while not wearing a mouthguard. None of the female athletes have suffered any orofacial injury. The type of the orofacial injuries that athletes have suffered were soft tissue injuries (50%) and injuries to the teeth (50%).

Problems associated with mouthguards are indicated in Table 9. The most commonly identified problems were difficulty in speech (47.3%), difficulty in breathing (17.3%) and dry mouth (16.4%).

## Discussion

The first part of the study shows that many coaches in the secondary schools of Ankara train teams that play volleyball, handball, basketball and soccer, all of which are contact sports, meaning that students take part in such sports activities. Although these sports deserve compulsory mouthguard use, in the present study it is observed that children and adolescents 11–18 years of age do not use a mouthguard during these sports activities. There is a lack of awareness of the risk of oral injury in this age group. This result differs from Onyeaso and Adegbesan's study (4), which reported that 88.1% percent of the coaches involved in their study group had rated their athletes' acceptance of mouthguards as favorable.

It has been proved that mouthguards decrease the orofacial trauma rates significantly. Stenger et al. (15) reported that in football, with the introduction of face masks, dental injuries were reduced to almost half (50%) and with the addition of mouthguards the number of dental injuries in this sport decreased to 1.4%.

The present study demonstrates a cognitive dissonance between attitudes of coaches and their feelings about mouthguards. The results of this study show that the majority of these Turkish coaches agreed on the protective roles of mouthguards against sport-related orofacial injuries, but they do not advise or try influence the adolescent athletes into using one.

It was found that 95.5% of the coaches would like to have more information on mouthguards. In the present study, the beliefs of the coaches in charge of adolescent athletes and their desire for more information on different types are very similar to those reported by McNutt et al. (14). The present study suggests the need for more education of these coaches on the importance of mouthguards for their athletes. Dentists should be more involved in providing them with information. To this end, courses for coaches would be beneficial.

The population of the second part of the study consisted largely of males. Therefore, it did not address differences in terms of the rate of injury and the rate of mouthguard utilization based on gender. The orofacial trauma rate in this study group was 13.2%. All the injuries happened while mouthguards were not being used. There were no injuries reported by athletes to have happened while using a mouthguard. In this study, professionally fitted mouthguards were not used by any of the athletes. Selection may be influenced by limited knowledge and the fact that custom made mouthguards are not readily available.

Although ice hockey is one of the sports that results in the greatest number of orofacial injuries (16), the lowest usage rate in this study was found to be among the ice hockey group (16.6%). The reason mentioned for this was that they believed a face mask was enough for orofacial protection. This result is contrary to the findings reported by Ferrari and Medeiros (17) who reported 91.3% utilization Further research is needed to determine the risk of orofacial injury in all contact sports in Turkey. In the present survey, it was found that the level of usage, knowledge and awareness regarding the benefits of using a mouthguard in Turkey are minimal. Dentists as well as other healthcare professionals should educate players, parents and coaches in order to promote the use of mouthguards in professional and amateur sports, especially for adolescents. Dental professionals, especially pediatric dentists, should regularly question patients about parents' sports participation and inform them about orofacial injury risk and suggest the use of a mouthguard.

### Conclusion

The study showed that the majority of Turkish coaches agree on the benefits of mouthguards but their knowledge is limited. Likewise, university athletes more commonly use mouthguards but they don't have much information about professionally fitted mouthguards.

It was concluded that the use of mouthguards during professional or amateur sport activities should be promoted in Turkey.

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