

Article

Dental Trauma and Mouthguard Usage among Soccer Players in Izmir, Turkey

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Abstract: The aims of this study were to verify the occurrence of dental injuries in 343 amateur Turkish soccer players in Izmir and the level of knowledge of the teams' soccer players about mouthguards. The soccer players were interviewed to determine the occurrence of dental trauma during soccer and mouthguard usage level. The data were analyzed with descriptive analysis to determine absolute and relative frequencies of answers for each one of the questions. Only 35 (10.2%) soccer players reported the occurrence of some type of dental injury during soccer practice. Regarding emergency conducts, approximately 84 players (24.48%) answered that replantation could be obtained after teeth avulsion, 23 players (27.38%) answered that successful replantation could be obtained within 2 hours immediately after injury, and 60.71% were not able to answer this question. Regarding mouthguard use, 61.8% of soccer players did not know about mouthguards. It was possible to conclude that dental injuries are common during amateur soccer practice and that there is a lack of information in the soccer players related to the emergency conducts and prevention of dental trauma.

Keywords: dental trauma; mouthguard; amateur soccer; oral injuries

1. Introduction

Individuals worldwide are participating in an expanding arena of physical activities as well as competitive sports at all levels. The health benefits of such activities are limited with injury risks that include orofacial soft- and hard-tissue trauma [1]. The main causes of traumatic dental injuries are falls and coming into collisions and both factors are commonly seen during sports practice. It has been shown that sports practice increases the risk of traumatic injuries [2–4]. Various studies have observed that sport accidents have six times higher risk than work-related accidents, and three times higher risk than traffic accidents [5,6].

People who are taking part in sports with close body contact are especially prone to orofacial injuries [7]. According to the International Dental Federation, there are two risk categories for dental trauma: high-risk sports, such as American football, ice hockey, inline-skating, skate-boarding, lacrosse, rugby and mountain-biking; and medium-risk sports, such as basketball, team handball, squash, gymnastics, water polo and soccer [8].

One hundred and twenty million people are estimated to take part in soccer matches worldwide [9]. Soccer is one of the most popular team sports in the world, with roughly 240 million amateur and 200,000 professional players [10,11]. Despite the popular belief that soccer is not a violent sport, it presents a high risk of injuries compared to athletes, including oral and craniofacial injuries [1]. The risk occurs due to the aggressive defense system, resulting in greater possibility of traumatic accidents [7,12]. In a study of Gay-Escoda 21.4% of the soccer players were suffering from dental trauma [11]. Data about the risk of injuries in Turkey were not available.

Several studies have demonstrated that oral health directly effect the soccer players' physical conditions. However, dental trauma in sports differs from other dental traumas, and it is possible to easily prevent and there is also the possibility to reduce the occurrence levels by the usage of mouthguards (MG) [13,14].

Upper incisors are the most predisposed teeth to injuries (52%–90% of all trauma cases) because of their location and predominantly uncomplicated crown fractures were reported (44%–62.5% of all dental trauma cases) [15]. The use of MGs in contact sports is highly recommended because of their ability to absorb the shock of the force thereby protecting teeth [16,17]. MG offers protection against dental and periodontal tissues during contact sports and decreases the number and severity of injuries [16]. Previous studies have shown to be reducing the risk of the injuries [16,17]; however, they are not yet widely accepted in many sports, which involve close body contact [12,18]. Most of the athletes do not recognize the necessity of using a MG [19–24] others anticipate problems in verbal communication, poor retention, breathing difficulties and disagreeable esthetics [15,25].

The aims of this study were to investigate the frequency of dental trauma in soccer players and to evaluate the level of information about dental trauma and wearing habits of mouthguards and knowledge about MG usage.

2. Subjects and Methods

The Research Ethics Committee of University of Ege approved the study (13-11/14). The present study was based on data obtained from personal and direct interview, through questionnaires answered

by four teams' licensed amateur soccer players in İzmir city's clubs (Göztepe, Buca, Karşıyaka, Altınordu). Three hundred forty three male soccer players were interviewed. Soccer players who were playing football at least for 1 year were included.

The questionnaire was including the questions about age, sex, type and time of sports practice, about dental injuries (personal experience—awareness of first aid and procedure about tooth avulsion) and about the knowledge and use of mouthguards. (Table 1)

Table 1. Questionnaire.

Questions about Age, Sex, Type and Time of Sports Practice
Name, surname, age
How long have you been licensed to play football?
How many hours a week do you have training sessions?
Questions about Dental Injuries (Personal Experience—Awareness of First Aid and Procedure about Tooth Avulsion)
Have you ever had any trauma in your jaws?
Have you ever had any soft tissue trauma?
Have you ever suffered from a dental injury in football? If yes, where, when?
If yes, how this occurred?
If yes, what kind of dental injury? (Avulsion, fracture, dislocation...)
If yes, which teeth had been traumatized?
If yes, how many teeth were exposed to trauma?
Have you visited a dentist after trauma?
If yes, when did you visit the dentist? (Immediately, on the same day, after a day)
If yes, what kind of dental treatment was applied?
Are you aware that an avulsed tooth can be replanted?
In your opinion, how much time is required for replacement of an avulsed tooth?
How would you transport an avulsed tooth to the dentist?
Questions about Knowledge and Use of Mouthguards
Have you heard of mouthguards? (Figure 1)
Do you wear a mouthguard? If not, why? (not necessary, doesn't know, esthetics, breathing, communication, costs)

Figure 1. Commercially available mouthguard on the market.



The collected data were analyzed using version 13.0 of the SPSS software for Windows (SPSS Inc., Chicago, IL, USA) and the level significance was set at 5%. Descriptive and frequency distribution measures were used for the quantitative and qualitative variables, respectively.

3. Results and Discussion

The average age of the interviewers was 15.11 ± 1.95 years (11–21 years). All soccer players were playing football in the teams for a minimum of 1 year and maximum of 9 years (mean = 4.14 ± 2.06 years). Players were training 7.98 ± 2.75 h a week. Table 2 shows the questions about dental trauma occurrence and the absolute and relative frequencies of the obtained data.

Table 2. The awareness of first aid and procedure about tooth avulsion-storing conditions.

Tooth Avulsion-Storing Conditions	Number	Percent (%)
Doesn't know	45	53.57
Milk	3	3.57
Saline Solution	2	2.38
In Dry Paper Towel	8	9.52
Alcohol	4	4.76
Water	5	5.95
Saliva	1	1.19
Ice	16	19.04
Juice	-	-

Some soccer players had already been affected by dental trauma, which was separated into the following categories: injuries of the bone tissue, soft tissues, and hard and periodontal tissue of teeth.

Only 3 players (0.87%) have experienced trauma including bone tissues and 60 players (17.49%) have experienced soft tissue traumas. Thirty five of the players (10.2%) had also suffered from dental trauma including hard and periodontal tissues.

Among the participants, 35 (10.2%) players had experienced accidents resulting in dental trauma. Two of the players had injured more than two teeth (5.71%). Crown fractures were the most common injury (88.57%). The frequency of dislocations and avulsions (5.71%) were found to be less.

As stated in a previously published review, amateur athletes had been found to suffer from traumatic dental injuries more often than professionals. This could be attributed to the lower level of developed ability and skills. It can be anticipated that amateurs might develop less experience compared to professionals due to less witnessed traumas [26].

Only 2 of the players visited dentists immediately after dental trauma. Another 7 players visited the dentist 1-day after the trauma history.

According to the replies about the awareness of first aid and procedure about tooth avulsion, 84 (24.48%) of the players knew that replantation of the avulsed tooth is possible, and 17 (20.23%) of the players were aware of immediate replantation. Only 2 of the players replied 30 min, 4 of the players 2 h, 3 of the players 24 h and 7 of the players 1-2 days after the trauma for the time that was required for replacement of an avulsed tooth. Fifty-one (60.71%) of the players replied that reimplantation was impracticable. Table 2 presents the awareness of first aid and procedure about tooth avulsion-storing conditions.

Regarding mouthguard usage, a total of 131 of the players (38.2%) had knowledge about them. Only one (0.29%) of 343 individuals was using a mouthguard among the respondents. Furthermore, the comparison of the teams also did not show statistically significant differences ($p > 0.05$), 108 of the

players had the idea that a mouthguard was unnecessary (31.48%), and many believed that it would create communication problems (4.4%). Breathing difficulties were also mentioned (1.7%).

The literature shows limited data regarding soccer and dental trauma association [12]. This study focused on the frequency of soccer associated orofacial injuries, as well as on the knowledge about and the use of mouthguards.

The most frequent dental traumas reported in this study were dental enamel fractures (48.6%) and uncomplicated fracture of enamel-dentin (17.1%). This finding is in accordance with those of several authors that pointed to soccer as a violent sport with high risk of injuries [1,27,28].

Despite the fact that the minority of the respondents answered that they were aware of the possibility of replanting avulsed teeth, and the need for immediate action for successful prognosis, 75.5% of them either reported that an avulsed tooth cannot be replanted or 6.1% did not know the answer. The International Association of Dental Traumatology recommends that replantation must be done within a maximum of 1 h after the accident [29]. Unfortunately, none of the teams had a special dental department. The majority of the soccer players did not have adequate information about the emergency conducts after dental avulsion. The mandatory wearing of mouthguards in various sports like ice-hockey, boxing, American football, rugby and makes it possible to prevent dental injuries [17,21].

4. Conclusions

It can be concluded that dental injuries are common during Turkish licensed amateur soccer practice. Strategies should be developed to improve the knowledge of teams' soccer players about the prevention and management of dental injuries and about the usage of mouthguards.

In soccer, mouthguard wear is not mandatory. Studies have demonstrated that most soccer players do not have sufficient knowledge about mouthguards [19]. Two hundred and twelve (61.8%) players were not aware of mouthguards. This high rate could be attributed to the lack of information regarding this protective device. The most frequently mentioned reason for not using the mouthguards for the players was the belief that they were not necessary or side effects like lacking verbal communication or difficulties in breathing.

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Author Contributions

I.U., A.A.-Y. performed the study, wrote the manuscript. N.E., F.E., O.O. and R.A. designed the study, final editing of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

References

1. Tozoglu, S.; Tozoglu, U. A one-year review of craniofacial injuries in amateur soccer players. *J. Craniofac. Surg.* **2006**, *17*, 825–827.
2. Marcenes, W.; al Beiruti, N.; Tayfour, D.; Issa, S. Epidemiology of traumatic injuries to the permanent incisors of 9–12-year-old schoolchildren in Damascus, Syria. *Endod. Dent. Traumatol.* **1999**, *15*, 117–123.
3. Scariot, R.; de Oliveira, I.A.; Passeri, L.A.; Rebellato, N.L.; Müller, P.R. Maxillofacial injuries in a group of Brazilian subjects under 18 years of age. *J. Appl. Oral Sci.* **2009**, *17*, 195–198.
4. Frontera, R.R.; Zanin, L.; Ambrosano, G.M.; Flório, F.M. Orofacial trauma in Brazilian basketball players and level of information concerning trauma and mouthguards. *Dent. Traumatol.* **2011**, *27*, 208–216.
5. Muhtarogullari, M.; Demiralp, B.; Ertan, A. Non-surgical treatment of sports-related temporomandibular joint disorders in basketball players. *Dent. Traumatol.* **2004**, *20*, 338–343.
6. Hersberger, S.; Krastl, G.; Kühl, S.; Filippi, A. Dental injuries in water polo, a survey of players in Switzerland. *Dent. Traumatol.* **2012**, *28*, 287–290.
7. Tuli, T.; Hächl, O.; Hohlrieder, M.; Grubwieser, G.; Gassner, R. Dentofacial trauma in sport accidents. *Gen. Dent.* **2002**, *50*, 274–279.
8. Junge, A.; Rösch, D.; Peterson, L.; Graf-Baumann, T.; Dvorak, J. Prevention of soccer injuries: A prospective intervention study in youth amateur players. *Am. J. Sports Med.* **2002**, *30*, 652–659.
9. Putukian, M. Heading in soccer: Is it safe? *Curr. Sports Med. Rep.* **2004**, *3*, 9–14.
10. Rizzo, S.; Melloni, M. Incidence of orodental trauma in sports: Soccer, water polo and cycling. *Stomatol. Mediterr.* **1988**, *8*, 333–338.
11. Gay-Escoda, C.; Vieira-Duarte-Pereira, D.M.; Ardèvol, J.; Pruna, R.; Fernandez, J.; Valmaseda-Castellón, E. Study of the effect of oral health on physical condition of professional soccer players of the Football Club Barcelona. *Med. Oral Patol. Oral Cir. Bucal.* **2011**, *16*, 436–439.
12. Cerulli, G.; Carboni, A.; Mercurio, A.; Perugini, M.; Becelli, R. Soccer-related craniomaxillofacial injuries. *J. Craniofac. Surg.* **2002**, *13*, 627–630.
13. Newsome, P.R.; Tran, D.C.; Cooke, M.S. The role of the mouthguard in the prevention of sports-related dental injuries: A review. *Int. J. Paediatr. Dent.* **2001**, *11*, 396–404.
14. Müller, K.E.; Persic, R.; Pohl, Y.; Krastl, G.; Filippi, A. Dental injuries in mountain biking—A survey in Switzerland, Austria, Germany and Italy. *Dent. Traumatol.* **2008**, *24*, 522–527.
15. Caglar, E.; Kargul, B.; Tanboga, I. Dental trauma and mouthguard usage among ice-hockey players in Turkey primer league. *Dent. Traumatol.* **2005**, *21*, 29–31.
16. Tran, D.; Cooke, M.S.; Newsome, P.R. Laboratory evaluation of mouthguard material. *Dent. Traumatol.* **2001**, *17*, 260–265.
17. Ranalli, D.N. Sports dentistry and dental traumatology. *Dent. Traumatol.* **2002**, *18*, 231–236.
18. Bolhuis, J.H.; Leurs, J.M.; Flögel, G.E. Dental and facial injuries in international field hockey. *Br. J. Sports Med.* **1987**, *21*, 174–177.
19. Yamada, T.; Sawaki, Y.; Tomida, S.; Tohnai, I.; Ueda, M. Oral injury and mouthguard usage by athletes in Japan. *Endod. Dent. Traumatol.* **1998**, *14*, 84–87.

20. Lang, B.; Pohl, Y.; Filippi, A. Knowledge and prevention of dental trauma in team handball in Switzerland and Germany. *Dent. Traumatol.* **2002**, *18*, 329–334.
21. Perunski, S.; Lang, B.; Pohl, Y.; Filippi, A. Level of information concerning dental injuries and their prevention in Swiss basketball—A survey among players and coaches. *Dent. Traumatol.* **2005**, *21*, 195–200.
22. Persic, R.; Pohl, Y.; Filippi, A. Dental squash injuries—A survey among players and coaches in Switzerland, Germany and France. *Dent. Traumatol.* **2006**, *22*, 231–236.
23. Fasciglione, D.; Persic, R.; Pohl, Y.; Filippi, A. Dental injuries in inline skating—Level of information and prevention. *Dent. Traumatol.* **2007**, *23*, 143–148.
24. Johnsen, D.C.; Winters, J.E. Prevention of intraoral trauma in sports. *Dent. Clin. North. Am.* **1991**, *35*, 657–666.
25. Scott, J.; Burke, F.J.; Watts, D.C. A review of dental injuries and the use of mouthguards in contact team sports. *Br. Dent. J.* **1994**, *176*, 310–314.
26. Glendor, U. Aetiology and risk factors related to traumatic dental injuries—A review of the literature. *Dent. Traumatol.* **2009**, *25*, 19–31.
27. Papakosta, V.; Koumoura, F.; Mourouzis, C. Maxillofacial injuries sustained during soccer: Incidence, severity and risk factors. *Dent. Traumatol.* **2008**, *24*, 193–196.
28. Pribble, J.M.; Maio, R.F.; Freed, G.L. Parental perceptions regarding mandatory mouthguard use in competitive youth soccer. *Inj. Prev.* **2004**, *10*, 159–162.
29. Flores, M.T.; Andersson, L.; Andreasen, J.O.; Bakland, L.K.; Malmgren, B.; Barnett, F.; Bourguignon, C.; DiAngelis, A.; Hicks, L.; Sigurdsson, A.; *et al.* Guidelines for the management of traumatic dental injuries. II. Avulsion of permanent teeth. *Dent. Traumatol.* **2007**, *23*, 130–136.

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