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Research Article / Araştırma Makalesi

Evaluation of Dental Trauma Knowledge Levels of Cyclists in Turkiye

Türkiye'de Bisiklet Sporcularının Dental Travma Bilgi Düzeylerinin Değerlendirilmesi

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ABSTRACT

Background: Cycling is a risky sport in terms of dental injury. Immediate treatment of traumatized teeth is very critical for the prognosis. This study aims to evaluate the knowledge levels and attitudes of cyclists in Turkey about dental trauma and its emergency treatment.

Methods: In the study, a total of 12 questions were asked in the online questionnaire directed to the participants in different cities in Turkey. The answers received were divided into three groups according to their cycling experience; Group 1: less than 5 years, Group 2: 6-10 years, and Group 3: more than 11 years, and evaluated with the Chi-square and Bonferroni multiple comparison tests. P value < 0.05 was accepted as statistically significant.

Results: According to the data obtained; It was determined that 31.8% of the participants in Group 3 and 10.4% of the participants in Group 2 did not use protective equipment while cycling (P<0.05) and 65.7% of the participants in Group 2 used helmets and goggles (P<0.05). As another finding, 22.4% of the participants in Group 2 and 8.4% of the participants in Group 1 answered that the avulsed tooth should be kept in saliva until the intervention (P<0.05).

Conclusions: Individuals who use bicycles should be informed about dental injuries. It is important to organize training programs about dental trauma and emergency interventions for them.

Keywords: bicycling, survey, tooth injuries

ÖZ

Amaç: Bisiklet kullanımı, diş yaralanmaları açısından riskli bir spordur. Travma geçirmiş dişlerin acil tedavisi prognoz açısından çok kritiktir. Bu çalışma, Türkiye'deki bisiklet sporcularının dental travma ve acil tedavisi hakkındaki bilgi düzeylerini ve tutumlarını değerlendirmeyi amaçlamaktadır.

Gereç ve Yöntemler: Araştırmada Türkiye'nin farklı illerindeki katılımcılara yöneltilen çevrim içi ankette toplam 12 soru sorulmuştur. Alınan cevaplar bisiklet deneyimlerine göre üç gruba ayrıldı; Grup 1: 5 yıldan az, Grup 2: 6-10 yıl ve Grup 3: 11 yıldan fazla olup Ki-kare ve Bonferroni çoklu karşılaştırma testleri ile değerlendirildi. P değeri < 0.05 istatistiksel olarak anlamlı kabul edildi.

Bulgular: Elde edilen verilere göre; Grup 3'teki katılımcıların %31,8'inin ve Grup 2'deki katılımcıların %10,4'ünün bisiklet sürerken koruyucu ekipman kullanmadığı (P<0,05) ve Grup 2'deki katılımcıların %65,7'sinin kask ve gözlük kullandığı (P<0,05) belirlendi. Diğer bir bulgu olarak Grup 2'deki katılımcıların %22,4'ü ve Grup 1'deki katılımcıların %8,4'ü avülse dişin müdahaleye kadar tükürükte tutulması gerektiğini bildirdi (P<0,05).

Sonuç: Bisiklet kullanan bireyler diş yaralanmaları konusunda bilgilendirilmelidir. Diş travmaları ve bunlara yönelik acil müdahaleler konusunda eğitim programlarının düzenlenmesi önemlidir.

Anahtar Kelimeler: bisiklet, anket, diş yaralanmaları

INTRODUCTION

Traumatic dental injuries are ranked as the fifth most common health problem worldwide, with no discernible difference in prevalence or incidence across all regions of the world.[1] While the oral region accounts for 1% of the total body area, orofacial injuries account for 5% of all bodily injuries in all age groups.[2] It was revealed that the most frequent causes of dental trauma are falls, sports activities, bicycling accidents, traffic accidents, and physical violence.[3]

Cycling is a popular mode of transport and a popular leisure activity. Studies show that the popularity of cycling has increased significantly in Turkey in recent years, in parallel with global trends.[4] Although bicycling is environmentally friendly, economic, and healthy, it has a high prevalence of oral and maxillofacial injuries.[5, 6] Bicycle injuries are a significant part of traffic accidents. Although actual rates are difficult to determine due to widespread underreporting, the global prevalence of bicycle road injuries was more than 30 million, according to the Global Burden of Disease Study 2017.[7] The number of cycling-related injuries worldwide is increasing every year.[8]

It was observed that 22.3% of all injuries of traumatized cyclists were in the head region and 34.8% in the face area.[9] While dental trauma prevalence has been investigated in Turkey, no study has been carried out about orofacial or dental trauma in adults during cycling.[10-13] The purpose of this study is to identify the prevalence of orofacial and dental trauma during cycling, as well as to assess the attitudes and knowledge levels of amateur cyclists over the age of 18 in Turkey.

MATERIALS AND METHODS

The study was approved by the Clinical Research Ethics Committee of Gaziantep University (2021/377). The study population included members of 57 cycling groups on social media. Professional cyclists and individuals aged under 18 were not included in the study. A three part closed questionnaire was used to collect the data. A translated version of the questionnaire is given in **Table 1**. Part I was used to identify the sociodemographic profiles of respondents (location, age, gender), and Part II was about information related to cycling and protection equipment. Part III comprised 12 questions used in previous studies about orodental trauma (trauma-related thoughts, knowledge of trauma, and trauma experience). The respondents were not asked to write their names to ensure anonymity. In February 2022, information messages and the link of the electronic questionnaire addressing knowledge, behavior of dental injury emergency treatments, and dental trauma experiences were sent to the home pages of the amateur cycling groups on social media (https://docs.google.com/forms/). Amateur cyclists from 42 cities in Turkey who completed the questionnaire were divided into three groups based on their cycling experience to examine the relationship between experience and other factors: Group 1: less than 5 years, Group 2: 6-10 years, and Group 3: more than 11 years. To investigate the relationship between two categorical variables, Chi-square and Bonferroni multiple comparison tests were applied to investigate the frequencies and percentages were given as descriptive statistics. Statistical analysis was performed with SPSS for Windows version 24.0, and a P value < 0.05 was accepted as statistically significant.

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Table 1. English translation of the questionnaire

PART I Identifying information

City/Age/Gender

PART II Information related to cycling

1-How long have you been cycling? (less than 1 year, 1-5 years, 6-10 years, more than 10 years)

2-How many hours a week do you cycle? (less than 5 hours, 6-10 hours, more than 11 hours)

Protection equipment

3-What kind of equipment do you use to protect your head while cycling? (I don't use any protection equipment, helmet, safety goggles)

PART III Dental trauma-related thoughts

4-Do you think that an orofacial injury can occur during cycling? (yes, no)

Knowledge of dental trauma management

5-What would you do if you saw someone suffering from an orofacial injury?

(I take her/him to the doctor-hospital emergency room as soon as possible.)

(I don't know what to do.)

(I take her/him immediately to the dentist-dental clinic-dental faculty.)

(I relax her/him and monitor her/his condition.)

6-Do you think an avulsed tooth can be replanted? (yes, no)

7-Do you think an avulsed tooth or broken tooth fragments should be found at the accident site and kept? (yes, no)

8-How do you think an avulsed tooth or broken tooth fragments should be stored until the intervention?

(In napkin, handkerchief or plastic bag, saline solution, in the patient's mouth-saliva, milk, tap water, other solutions)

9-In your opinion, within which period an avulsed tooth should be replanted?

(Time doesn't matter, within 1 hour, within 2 hours, more than 2 hours, I have no idea)

Experience of dental trauma

10. Have you ever seen an orofacial injury during cycling?

11-Have you ever suffered from an orofacial injury during cycling? (yes, no)

12-What kind of orofacial injury was it?

(Dental damage, soft tissue damage (tongue, lips, cheeks, gums, etc.), jaw or facial bone damage)

RESULTS

A total of 294 amateur bicyclists voluntarily returned by email. **Table 2** shows age groups, average weekly frequency of cycling, and cycling experience. According to the answers about protective equipment during cycling, 68 (23.1%) bicyclists were wearing only helmets and 7 (2.4%) were using only protective glasses. The number of people using both helmets and glasses was 145 (49.3%) and 73 (24.8%) bicyclists did not use any protective equipment. There were statistically significant differences between Group 2 and Group 3 in non-protective equipment-wearing groups (P<0.05) (**Table 3**). In both helmet and goggle-wearing groups, usage of helmet and goggle in Group 2 was significantly more than other groups (P<0.05). 193 (65.6%) of the respondents thought that their mouth or teeth could be damaged during cycling. Almost one-third of the bicyclists (n=92 / 31.3%) witnessed someone else suffering from orodental trauma while cycling.

Table 2. Distribution of gender, age groups, cycling frequency and experience of the participants

Demographic data	n	%
Gender		
Male	213	72.4
Female	81	27.6
Age groups		
<20	26	8.8
20-30	64	21.8
31-40	98	33.3
41-50	59	20.1
>50	47	16.0
Average weekly cycling duration		
< 5 hours	167	56.8
6-10 hours	83	28.2
>10 hours	44	15.0
Experience of cycling		
<5 years	95	32.3
6-10 years	67	22.8
>10 years	132	44.9

Table 3. Distribution of the answers to the question about equipment to protect their head while cycling according to the experience

	Group 1† (n=95)	Group 2‡ (n=67)	Group 3§(n=132)
	n (%)	n (%)	n (%)
I don't use any equipment	24 (25.3)	7 (10.4)	42 (31.8)
Helmet	28 (29.5)	14 (20.9)	26 (19.7)
Safety goggles	2 (2.1)	2 (3.0)	3 (2.3)
Helmet and safety goggles	41 (43.2)	44 (65.0)	61 (46.2)

There are variables found to be significant according to the Chi-square test. (P = 0.018)
† <5 years experienced cyclists
‡ 6-10 years experienced cyclists
§ >10 years experienced cyclists

Table 4 summarizes the trauma experiences of the participants and how participants would primarily treat someone who has suffered orofacial trauma. 154 (52.4%) of the participants stated that they would take the wounded to a hospital or emergency room first, and only 84 (28.6%) of them would take her/him to a dentist or dental clinic. 21 (7.1%) of the participants reported that they did not know what to do. Of the respondents, 170 (57.8%) did not think that an avulsed tooth could be replanted. There was no statistically significant difference among the groups in terms of orofacial injury experience, witnessing the injury, and information about the approach to the injured person. 31 (10.5%) of the participants suffered orofacial trauma during cycling. Fifteen (37.5%) of them had dental injury, 23 (57.5%) had soft tissue damage, and 10 (25%) had jaw or facial bone injury.

Table 4. Distribution of the answers of the questions about trauma experience according to the experience

	Group 1† (n=95)	Group 2‡ (n=67)	Group 3§(n=132)	p value
	n (%)	n (%)	n (%)	
Have you ever suffered from an orofacial injury during cycling?				
Yes	13 (13.7)	4 (6.0)	14 (10.6)	p=0.289
Have you ever seen an orofacial injury during cycling?				
Yes	24 (25.3)	23 (34.3)	45 (34.1)	p=0.305
What would you do if you saw someone suffering from an orofacial injury?				
I don't know what to do	7 (7.4)	7 (10.4)	7 (5.3)	p=0.390
I take her/him immediately to the dentist-dental clinic-dental faculty	25 (26.3)	17 (25.4)	42 (31.8)	
I take her/him to the doctor-hospital emergency room as soon as possible	48 (50.5)	39 (58.2)	67 (50.8)	
I relax her/him and monitor her/his condition	15 (15.8)	4 (6.0)	16 (12.1)	

† <5 years experienced cyclists
‡ 6-10 years experienced cyclists
§ >10 years experienced cyclists

From the point of view of the participants' opinions regarding the knowledge of post-traumatic replacement of the avulsed tooth (**Table 5**), 124 (42.2%) of the participants answered that an avulsed tooth can be replanted. Only 39 (13.3%) participants answered that an avulsed tooth should be kept in milk until treatment. There was a statistically significant difference in the knowledge about keeping the media of the avulsed tooth; Group 2 was superior to Group 1 (P<0.05). While 41 (13.9%) of the respondents knew that an avulsed tooth should be replaced within 1 hour, the majority of respondents (n = 213/72.4%) had no idea about the replacement duration of an avulsed tooth.

Table 5. Distribution of the answers of the questions about dental trauma management according to the experience

	Group 1† (n=95)	Group 2‡ (n=67)	Group 3§(n=132)	p value
	n (%)	n (%)	n (%)	
Do you think an avulsed tooth can be replanted?				
Yes	46 (48.4)	25 (37.3)	53 (40.2)	p=0.303
Have you ever seen an orofacial injury during cycling?				
Milk	18 (18.9)	6 (9.0)	15 (11.4)	p=0.036 *
Saline solution	21 (22.1)	8 (11.9)	22 (16.7)	
In the patient's mouth-saliva	8 (8.4)	15 (22.4)	22 (16.7)	
Tap water	4 (4.2)	2 (3.0)	4 (3.0)	
Other solutions	10 (10.5)	9 (13.4)	23 (17.4)	
In your opinion, within which period an avulsed tooth should be replanted?				
Within 1 hour	13 (13.7)	10 (14.9)	18 (13.6)	p=0.733
Within 2 hour	8 (8.4)	7 (10.4)	8 (6.1)	
More than 2 hours	0 (0.0)	1 (1.5)	2 (1.5)	
Time doesn't matter	7 (7.4)	3 (4.5)	4 (3.0)	
I have no idea	67 (70.5)	46 (68.7)	100 (75.8)	

† <5 years experienced cyclists
‡ 6-10 years experienced cyclists
§ >10 years experienced cyclists
** There are variables found to be significant according to the Chi-square test at 0.05 level.*

DISCUSSION

Cycling has been considered as a sport by some researchers in studies on bicycle-related injuries, while it has been classified as a game or leisure activity by others. Other studies have examined bicycle crashes as part of traffic accidents, as they have focused on the transportation aspect of cycling. As a result, data from studies in the literature addressing cycling-related trauma were collected under several topics.[7, 9, 14, 15]

According to 2020 traffic accident data, 0.57 % of those involved in fatal and injured traffic accidents in Turkey were cyclists.[16] However, in a study based on 5-year hospital records, the rate of head trauma in bicycle accidents was determined as 20.1% in Ankara, Turkey.[17] To the best of current knowledge, this is the first study to investigate the incidence of cycling-related orofacial injuries in amateur cyclists over the age of 18, as well as attitudes towards dental trauma and dental emergency procedures.

One of the limitations of this study was the low number of participants from the cycling group members who organized on social media for the survey based on volunteerism. Although the exact number of amateur cyclists is not known, there are 94 permanent cycling societies, clubs, or associations in Turkey.[18] Therefore, 294 responses to the questionnaire demonstrated that orofacial trauma in cycling did not attract enough attention among social media groups.

About half of the participants in the present study (57.5%) with orofacial trauma had soft tissue damage, including tongue, lips, cheeks, or gums. This rate was close to that of a Brazilian study (55%) but much higher than the finding of a study in Austria that focused on trauma patients, which found that 14% of cases caused by bicycles had soft tissue injuries. This difference was probably related to the higher helmet use rate of cyclists in Austria.[19, 20]

In the present study, 10.5% of cyclists experienced bicycle-related dental trauma, which was similar to the prevalence observed by Levin et al. (6.3%) and Lam et al. (7.7%) in adults.[8,21] However, the incidence of dentoalveolar trauma was 36.4 % in a prospective study of cyclists with maxillofacial trauma, while the prevalence of dental injury alone was 30.2 %.[22] A study conducted in the United States observed that the incidence of bicycle-related injuries in children was highest in those aged 5-14 years, and children aged 5-9 years had the highest rates of facial trauma.[23] Similarly, the highest rates of bicycle-related trauma admitted to pediatric emergency services in Turkey were seen in children aged 6-10 years.[24, 25] Contributing to this issue, the prevalence reported in studies of bicycle-related dental trauma among individuals under the age of 18 was between 13% and 19.2%.[26-28]

25% of the traumatized cyclists in the current study had injuries to their jaw and facial bones. A study supporting this data revealed that 45% of cyclists who were admitted to the hospital had a facial fracture, and there was a 1.2 fracture rate per patient.[20] According to an Israeli study, 55.5% of hospitalized cyclists had jaw injuries, with 26.4 % having maxilla injuries and 31.5% having mandible injuries.[22]

When a cycling accident occurs due to speeding, inexperience, poor road conditions, mechanical failures, or collision, a helmet is the main protection equipment for cyclists. Helmets reduce the risk of injuries to the upper and middle face by 65% for cyclists of all ages.[9] In the first year after the introduction of laws on compulsory helmet wearing by cyclists in Victoria, Australia, the number of cycling casualties admitted to hospitals with head injuries decreased by at least 37% compared to the previous year.[29] However, another study showed that the obligation to wear a bicycle helmet reduced the incidence of facial trauma by 65%, but did not reduce the incidence of dental trauma.[14] This was most likely because, in helmet design, head protection takes precedence over lower face protection. 72.4% (213) of those included in this study were wearing helmets while riding bicycles. According to limited research, the prevalence of helmet usage during cycling in Turkey was between 2.1 and 4.4 % in children and between 6.2% and 7.6% in teenagers.[30-32] According to current knowledge, there is no study on helmet usage in adults in Turkey, but a study examining trauma related to bicycle accidents in Ankara stated that none of the head trauma individuals of all ages wore helmets at the time of the accident.[17] As in many countries, educational practices and legal regulations that encourage the use of helmets while cycling can be made in Turkey.

In agreement with the literature, current study reported that the majority of the participants (n:170 / 57.8%) did not know that the avulsed tooth could be replanted. The study's rate was lower than previous studies in Turkey (between 81.4% and 65.5%)[33-35], but higher than a survey conducted in four European countries (%48).[36] Replantation time is an important factor affecting the success of treatment in avulsed teeth. In the current study, it was found that there was a majority (72.4%) who did not have any information

about the time of reimplanting of the avulsed tooth. Once avulsed teeth are poorly kept and transported, the destruction of periodontal ligament cells can result in inflammatory root resorption in the tooth.[37] The avulsed tooth's prognosis is determined by the extraoral dry time and the vitality of the root surface periodontal cells. The patient's mouth (in saliva or the tooth socket), milk, or saline solution are the most suitable and inexpensive transport media for avulsed teeth.[38] The findings of the current study showed that 36.4% of participants would maintain the avulsed tooth in dry condition like handkerchief and 13.3% would keep it in milk before the avulsed teeth were replanted.

According to the current study, amateur cyclists had erroneous information regarding oral emergency procedures. These findings were also in line with the observations of other published research in Turkey in other sports branches.[33-35] All the data collected in the current study and the literature disappointingly underlined the extremely low knowledge levels of first-aid procedures after dental trauma in societies around the world. One of the reasons for the current dramatic situation may be that emergency dental trauma procedures are often not covered in first aid training or textbooks.[39] Also, the possibility that only those with a sensitivity to dental trauma would fill out the questionnaire may not have reflected the actual situation of amateur cyclists. A further limitation was that, since the questionnaire was self-managed, participants at different educational levels could not be certain that the questions were sufficiently understood. The last limitation was that the traumatized participants reported their post-traumatic oral and dental health status in their own words. These injuries were not confirmed by examination by intraoral examination. The lack of evidence for this data from dental records and intraoral inspection may have prevented uniformity.

CONCLUSION

The study found that amateur cyclists have limited knowledge about the management of traumatic dental injuries. Given the growing popularity of bicycling, educational programs on dental trauma prevention and treatment are in high demand. In Turkey, amateur cyclists should be encouraged to wear helmets.

Değerlendirme / Peer-Review

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It is declared that during the preparation process of this study, scientific and ethical principles were followed and all the studies benefited are stated in the bibliography.

Benzerlik Taraması / Similarity scan

Yapıldı – ithenticate

Etik Bildirim / Ethical statement

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Makalenin Yazımı | Writing up: EÇ(%70), FT(%30)
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