Traumatized Anterior Teeth among 13-15 Years Old Intermediate School Students in Hilla City, Babylon Governorate- Iraq

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ABSTRACT

Background: Dental trauma in children and adolescents is a common public health problem in all societies and the prevalence of these injuries has increased during the past few decades. Injury of permanent teeth may cause cosmetic, functional and psychological problems to the patient. The aim of this study was to investigate the prevalence and severity of traumatized anterior teeth in relation to age, gender, type of injury and type of occlusion.

Materials and methods: An epidemiological survey was conducted through clinical exanimation of permanent anterior teeth among 3855 students, 13-15 years old enrolled in 17 public intermediate schools in Hilla city. Dental trauma were assessed according to Garcia-Godoy classification. Recording the type of occlusion according to criteria of Millis.

Results: The prevalence of students with traumatic dental injuries was 7.1% of the total sample. Simple enamel fracture was the most common type of injury among traumatized teeth while luxation was the least common type of dental injury. Males were more affected than females with statistically significant difference (P<0.001). while dental trauma was not associated with age (P>0.05). The highest prevalence of dental trauma was recorded among the 14 year age (7.9%). Most of the traumatized subjects had only one tooth traumatized (71.3%).The highest prevalence of traumatized students were found in class II division 1 malocclusion.

Conclusion: The prevalence of traumatized dental injuries was highly associated with gender and with class II division 1 malocclusion while it was not associated with age. Simple enamel fracture was the most common type of injury.

Keywords: Dental trauma, permanent teeth, type of occlusion.

INTRODUCTION

Dental trauma is an injury to the mouth, including teeth, lips, gingiva and tongue and the most common dental trauma is a broken or lost tooth[1] . In addition to that tooth injury could be described as a fracture , luxation or avulsion although a combination of injuries may occur in the same tooth [2]. The etiological factors of dental injuries are many and varied[3]. Although accidents due to falls appear to be the most common factor in both primary and permanent dentitions. Accidents as a result of sports, violence and road traffic accidents were the most common causes of dental trauma in permanent dentitions[4]. The frequency of trauma to the permanent dentition in school age children peaked in the age group 9-15 years [5] and 11-15 year olds [6]. In general, males were affected almost twice as females in both the primary and permanent dentitions[7, 8]. Traumatic dental injury may vary in its severity from a simple enamel fracture, which is the most prevalent type to multiple types of trauma affecting both soft and hard tissue, and even it may reach to a complete avulsion of the tooth [9, 10,]. Dental trauma may be classified into categories based on treatment protocols, these categories include: Enamel and crown fracture, dental luxation, dental extrusion and intrusion, dental concussion and subluxation, root fracture and dental avulsion[11] .

Dental injuries were approximately twice as frequent among children with class II division 1 malocclusion as among children with normal occlusion[10,12]. Maxillary central incisors were considered the most common injured teeth for both the primary and permanent dentitions while mandibular central incisors were the least teeth affected by trauma[13,14] .Other study reported that the dental injuries of secondary school children age 13-15 years old were almost entirely restricted to the maxillary central incisors (75%)[6].

Although many Iraqi studies had been conducted on the traumatized anterior teeth[8,10,15,16] but this study is considered the first one in Hilla city as there is no previous study in this city, so the aim of this study was to assess the prevalence and severity of traumatized anterior teeth in relation to age, gender, type of injury, dental treatment needs and type of occlusion to be used as a base line data.

MATERIALS AND METHODS

In this epidemiological study, a sample of (3855) 13-15 years old students. (2035 males and 1820 females) were selected randomly by cluster stratified sampling method from urban intermediate schools from different geographical areas in Hilla City,Babylon Governorate/ Iraq. Oral examination was performed in classrooms, the standard conditions for examination were followed according to the World Health Organization [17]. Examination of teeth to identify the type of the traumatic injury was performed according to the criteria of Garcia-Godoy [9]:

Class 1: Enamel fracture. Class 2: Enamel-dentin fracture without pulp exposure. Class 3: Enamel-dentin fracture with pulp exposure. Class 4: Enamel-dentin and cementum fracture without pulp exposure. Class 5: Root fracture. Class 6: Concussion (injury to the tooth without abnormal

loosening). Class 7: Luxation (loosening). Class 8: Intrusion (displacement of the tooth into the alveolar bone). Class 9: Extrusion (partial displacement of the tooth out of alveolar socket). Clsss 10: Avulsion(complete displacement of the tooth out of alveolar socket).

The type of occlusion (anterio-posterior occlusion) recorded in accordance to the criteria of Millis[18], students with chronic diseases and under orthodontic treatment were excluded from the study. Visual and tactile examinations were used for recording the type of dental injuries. Root fracture(Class 5) was not recorded as no radiographs were taken. A tooth that showed more than one type of injury was recorded once according to the highest score and when more than one tooth is traumatized the highest score is considered when type of dental injury is counted for each subject. Analysis of data was carried out using SPSS version 12. Statistical tests used were Paired t-test,Chi-square, Z-proportion test. The confidence limit was accepted at 95% , $P< 0.05$ was regarded as statistically significant and $P< 0.01$ were regarded as highly significant.

RESULTS

The study population consisted of 3855 students attending intermediate schools in Hilla city. 2035 of the sample were males (52.8%) and 1820 were females (47.2%) with an age ranged from 13-15 years. The distribution of the sample summarized in Table (1). Table (2) shows that the prevalence of traumatized students was found to be (7.1%) of the total sample examined, this prevalence was not associated with age ($P>0.05$). For the total sample examined, males were highly significantly affected by trauma than females (Z - test = 3.243). Furthermore, the prevalence of traumatized students was highly significantly associated with gender ($P<0.01$). Table (3) illustrates the distribution of traumatized students according to the types of the dental injuries. The most common type of dental injury was found to be simple enamel fractures (Class1) (39.3%) .

Table (4) shows that, when the types of dental injury were studied according to the number of traumatized teeth, simple enamel fracture was the most prevalent type (48.5%).The type of the dental injury was found to be not associated with age and gender ($P>0.05$). All types of traumatic dental injuries were most common in males than females.

Table (5) reveals that traumatized students with class II division 1 malocclusion were the most common (50.2%) and class III malocclusion (4%) were the least common. Students at the age of 14 years have a higher prevalence of dental trauma (45.6%) than other age groups. Females recorded a lower prevalence of dental trauma in all types of occlusion . Figure (1) shows that type of occlusion was found to be associated with number of traumatized teeth ($X^2= 18.660$, d.f= 9, $P<0.05$). Table (6) shows the distribution of students with traumatized teeth in relation to the number of injured teeth, and it illustrates that single tooth trauma was the most common type (71.3%) . Statistically, no association was found between number of traumatized teeth and age ($P>0.05$). The maxillary central incisors (76.5%) were the most teeth affected by dental trauma while the mandibular canines (0.5%) were the least affected (Table 7).

Table 1: Distribution of students by age and gender.

Age	*Gender*	*No.*	*%*
13	Males	500	13.0
	Females	474	12.3
	Both	974	25.3
14	Males	602	15.6
	Females	538	14.0
	Both	1140	29.6
15	Males	933	24.2
	Females	808	21.0
	Both	1741	45.2
Total	Males	2035	52.8
	Females	1820	47.2
	Both	3855	100

Table 2: Distribution of students with and without traumatized teeth by age and gender.

Age	Gender	Without trauma	With trauma	X^2			
		No.	%	No.	%	Total	N.S
13	Males	450	90.0	50	10.0	500	
	Females	450	94.9	24	5.1	474	
	Both	900	92.4	74	7.6	974	
14	Males	550	91.4	52	8.6	602	
	Females	500	92.9	38	7.1	538	
	Both	1050	92.1	90	7.9	1140	
15	Males	864	92.6	69	7.4	933	
	Females	766	94.8	42	5.2	808	
	Both	1630	93.6	111	6.4	1741	
Total	Males	1864	91.6	171	8.4	2035	X^2= 10.484 d.f=1 P<0.01
	Females	1716	94.4	104	5.7	1820	
	Both	3580	92.9	275	7.1	3855	

Table 3: Distribution of traumatized students according to the types of the dental injuries by gender

Type of trauma	Male	Female	Total			
	No.	%	No.	%	No.	%
1	68	39.7	40	38.5	108	39.3
2	59	34.5	43	41.3	102	37.1
3	16	9.6	7	6.7	23	8.4
4	1	0.6	0	0.0	1	0.4
6	11	6.4	10	9.6	21	7.6
7	4	2.3	0	0.0	4	1.5
8	1	0.6	0	0.0	1	0.4
9	1	0.6	0	0.0	1	0.4
10	10	5.8	4	3.8	14	5.1
Total	171	8.4	104	5.7	275	7.1

Table 4: Distribution of traumatized teeth according to the types of the dental trauma by age

Age	13	14	15	Total				
Type of trauma	No.	%	No.	%	No.	%	No.	%
1	43	44.3	65	50.8	80	49.1	188	48.5
2	33	34.0	42	32.8	45	27.6	120	30.9
3	8	8.3	9	7.1	15	9.2	32	8.3
4	0	0.0	0	0.0	1	0.6	1	0.3
6	6	6.2	7	5.5	11	6.7	24	6.2
7	2	2.1	0	0.0	4	2.4	6	1.5
8	1	1.1	0	0.0	0	0.0	1	0.3
9	0	0.0	0	0.0	1	0.6	1	0.3
10	4	4.1	5	3.9	6	3.7	15	3.8
Total	97	25	128	33	163	42	388	100

Table (5):Distribution of traumatized students according to type of occlusion by age and gender.

Age	Type of occlusion								Total
	Class I		Class II div.1		Class II div.2		Class III		
	No.	%	No.	%	No.	%	No.	%	
13	22	29.7	48	64.9	3	4.1	1	1.4	74
14	42	46.7	41	45.6	5	5.6	2	2.2	90
15	42	37.8	49	44.1	12	10.8	8	7.2	111
Gender									
Males	56	32.7	95	55.6	14	8.2	6	3.5	171
Females	50	48.1	43	41.3	6	5.8	5	4.8	104
Both	106	38.5	138	50.2	20	7.3	11	4.0	275

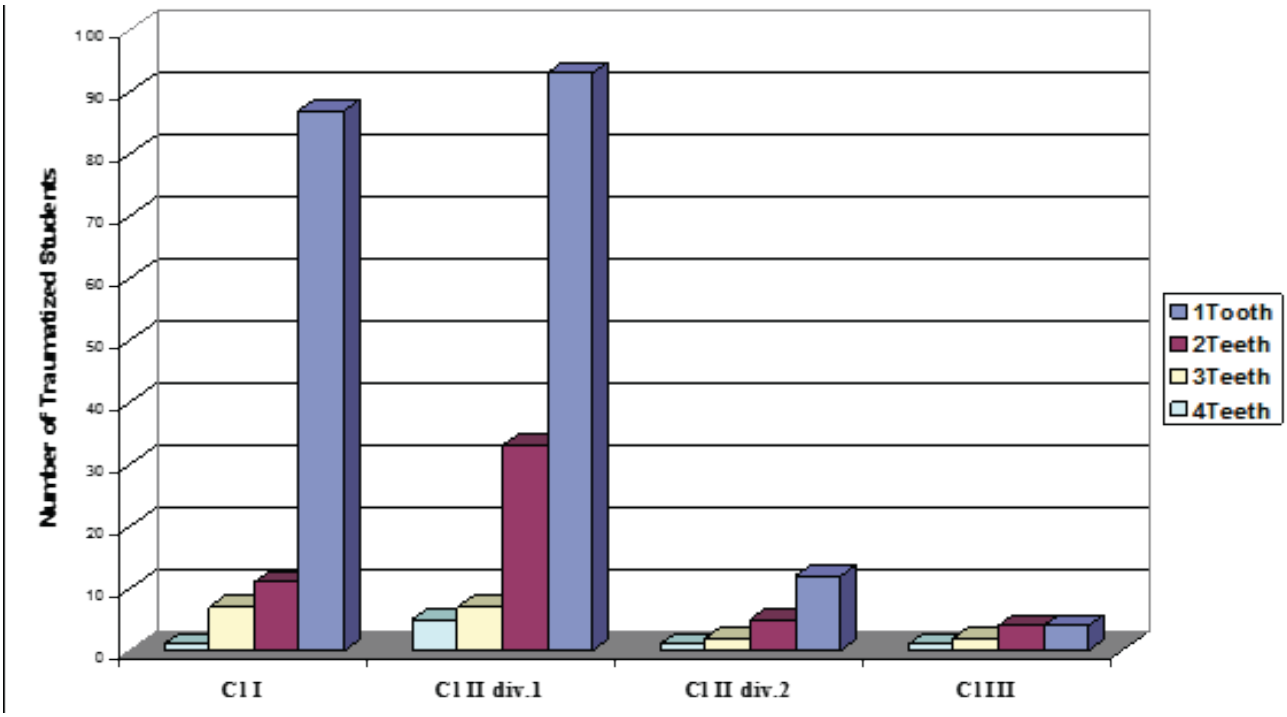

Figure 1: Distribution of traumatized students according to type of occlusion by number of traumatized teeth.

Table (6): Distribution of students according to the number of traumatized teeth by age.

Age	Number of traumatized teeth								Total	X2
	One tooth		Two teeth		Three teeth		Four teeth			
	No.	%	No.	%	No.	%	No.	%		
13	56	75.7	15	20.3	2	2.7	1	1.4	74	
14	65	72.2	15	16.7	8	8.9	2	2.2	90	N.S
15	75	67.6	23	20.7	8	7.2	5	4.5	111	
Total	196	71.3	53	19.3	18	6.6	8	2.9	275	

Table 7: Distribution of traumatized teeth according to the type of tooth.

Position	Central		Lateral		Canine		Total	
	No.	%	No.	%	No.	%	No.	%
Maxillary	297	76.5	25	6.5	13	3.3	335	86.3
Mandibular	39	10	11	2.8	3	0.5	53	13.7
Total	336	86.5	36	9.2	16	4.1	388	100

DISCUSSION

Since this study was the first one conducted in Hilla city, so the data collected could be used as a base line data. The prevalence of dental trauma in this cross-sectional study was recorded to be (7.1%), this

prevalence was higher than that recorded by many studies on permanent dentition [16, 19, 20], while it was lower than the prevalence of studies on permanent anterior teeth that reported by many authors[6,10, 21].

The causes responsible for this low prevalence of dental injury in comparison with other studies are the differences in geographical area, sampling technique and sample size. On the other hand, although the sample size in the present study was smaller than the Iraqi study that previously dealt with this subject[16], the prevalence of traumatic dental injury was higher. This reveals the increasing rate of traumatic dental injury among those age groups in Hilla city and this could be explained by the fact that the attitude and knowledge regarding treatment of injured teeth was not impressive or it could be explained by the fact that teenagers and adolescents have accumulative dental treatment needs[6].

Regarding gender variation in relation to traumatic dental injury, this study illustrated that males (8.4%) were highly significantly affected by dental trauma compared to females (5.7%). This result was in agreement with many epidemiological studies[6, 8,10, 16,21, 20]. Results also showed that males were more affected than females in all age groups; the reasons for this gender difference may be due to the fact that males tend to be more active and participate in strenuous activities with higher trauma risk, such as contact sports and more aggressive types of playing. Whereas females tend to be more mature in their behavior and may be more concerned about their physical appearance and aesthetics which possibly reflects the play characteristics of females toward more stability and calmness than males[10, 22], as well as one can assume that mothers were more concerned about the esthetic of their female daughters than males, seeking dental treatment quickly after dental injuries.

The results of this study also show that the prevalence of traumatized subjects was not associated with age. This result is in agreement with previous studies[7,16], while it is in disagreement with others [6, 8,10]. This may be attributed to the limited age groups involved in this study or it could be explained by the finding reached by the Iraqi study which concluded that the prevalence of traumatized children was increased until age 10 years old then decrease steadily [10], because subjects become more mature as they grow older and become sensitive from their false behavior as well as tend to listen to their teacher and parent's advice[23].

The finding of the present study concerning the type of dental injury was in agreement with other epidemiological studies which concluded that, simple enamel fracture was the most common type of dental injury followed by enamel and dentine fracture without pulp exposure then enamel and dentine with pulp exposure[10,15]. The high percentages of simple enamel fracture and enamel-dentine fracture compared to other types of dental injuries could be explained by the fact that these two types of injuries may not provoke the parents for immediate dental treatment as the cases with other injuries. On the other hand the low percentage of other types of dental injury like luxation, intrusion ,extrusion and avulsion because these types of injuries were more frequent in the primary dentitions due to the resiliency of supporting alveolar bone, small crown and their short roots favor their dislocation rather than their fracture [24], while in permanent dentitions, as with aging, the resiliency of bone decrease and the impact of exposure will be on the tooth itself [25].

However, sever type of trauma such as avulsed teeth were found to be more in males compared to females, this may be due to that the majority of the avulsed teeth occurred in the boys as a result of blow on the face during fight and contact sports [6].

A higher prevalence of dental trauma was recorded in class II malocclusion particularly division 1 (50.2%) compared to other types of occlusion. This finding was in agreement with other studies[8,10, 16]. The explanation of this result is that in cases with normal occlusion, the energy of the trauma is decreased by the larger contact area, the incisal contact of the upper and lower teeth while in cases with class II malocclusion, the lack of incisal contact and the location of this contact in the cervical part of the upper incisors, all increases the risk of being traumatized in children with class II malocclusion[26]. Results also revealed that the type of occlusion was associated with the number of traumatized teeth and this is in disagreement with other study [16]. This may be due to combination of both; anatomical risk factors

and aggressive behavior of the examined subjects.

The present study reveals that single tooth trauma was the most common type (71.3%) while four teeth trauma (2.9%) was the least one. This result was in agreement with other previous studies[6, 10,16]. This result could be explained by that when one tooth or two teeth are traumatized the majority of the force of the impact is dispersed by the fractured tooth or teeth and no more teeth will be injured [16]. In addition, this study shows that the maxillary central incisors were the most common teeth affected by dental trauma and this was in agreement with many previous studies[6,7, 10,16,27] This may be explained by the fact that the prominent and vulnerable position of the maxillary incisors in the face was responsible for their more frequent involvement in fractures than the lower teeth[28].

In conclusion, data of the present study clearly shows the need for dental health education of the children and their parents,so preventive programs are needed to improve the dental health of Iraqi children.

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