



RESEARCH ARTICLE

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PREVALENCE OF TRAUMATIC DENTAL INJURIES IN PERMANENT TEETH IN RELATION TO AGE, GENDER, AND PREDISPOSING FACTORS AMONG 6-12-YEAR-OLD SCHOOLCHILDREN IN AL NAJAF CITY

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Abstract

Background: Traumatic dental injuries (TDI) could have negative effects on the physical and psychosocial well-being of children. Prevalence of traumatic injuries in permanent teeth among 6-12 age school children in AL Najaf city Trauma to anterior teeth is a common reason for emergency room visits among children.

Methods: The study group included 600 (302 male and 298 female), At age range of 6 -12 years. The dental examination was done by using dental mirror, probe and cotton pellet under sufficient artificial light. Data including age, gender, type of trauma, number of teeth affected and causes were collected.

Results: TDI was found in 40 of samples 6.67% of the study group. TDI was found in age from 6 to 9 (8.2%) was higher than in from 10 to 12 (5.5%). According to the type of trauma type II was the most common (27.5%) followed by type III (25%) then type I (20%). The most common cause of trauma was fall (50%). Only 9 cases were treated from trauma (22.5%) with no significant association with age and gender groups. According to the teeth affected maxillary right central incisor was the most affected tooth.

Conclusion: Traumatic dental injuries were more common among younger children, with falls being the predominant cause and Type II trauma the most frequent pattern. The maxillary right central incisor was the most commonly affected tooth, while treatment was received by only a limited proportion of affected children.

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Introduction:-

Traumatic dental injuries (TDIs) represent a major public health problem and are one of the most common injuries to exist in the orofacial region. They are one of the most common reasons why a person seeks dental care, especially children and adolescents (1). A large portion of the population worldwide is affected, with hundreds of millions of people estimated to have sustained injuries involving their permanent teeth. Furthermore, many pressures in the world lead to trauma in the primary dentition, with millions of children suffering from this problem (2). Most of the traumatic dental injuries happen in children and people at teenage age, with 80% reported before age 20. The

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incidence of these injuries differs by age and sex, with distinct peaks in early childhood and the prepubertal years among boys, and a higher peak during early adolescence among girls (3). The higher incidence at these developmental ages may be related to the greater physical activity, as well as the sports and play of children during these years which certainly expose them more to falls and other accidental events. As a result, children and adolescents are an extremely high-risk group for TDIs.

Dental trauma has implications beyond the obvious physical damage. Most commonly, injuries can also impact the anterior teeth and, when untreated or resulting in visible crown fractures, may significantly influence in child's behavior, socialization skills (school performance) and daily functioning (4). Studies have found that children with trauma to the anterior teeth may be aware of their appearance and refrain from smiling or laughing candidly more than non-injured peers (5). Some may lose teeth, causing embarrassment and fear of smiling (1); others avoid participating in social activities altogether (2).

Dental trauma may show all its consequences during the adolescence, a very sensitive period characterized by the growing importance of physical appearance and peer interaction. Adolescents with visible chipped or broken teeth have been found to be more affected by impaired daily activities than their counterparts who show no evidence of PTSD (7). Nonetheless, traumatic injuries to the primary dentition may not always receive sufficient attention from parents and/or caregivers, particularly when they are perceived as involving only the dental crown. On the other hand, severe trauma that affects periodontal soft tissues, alveolar bone or any other supporting structures would need immediate dental or emergency service care. Traumatic dental injury is most common to the anterior part of the mouth and most TDI involve the anterior teeth (8,9).

Maxillary incisors have consistently been shown to be the tooth type that is most commonly affected by trauma among specific teeth. Furthermore, their relatively anterior position within the dental arch makes them more susceptible to direct trauma. Some specific anatomical and occlusal traits may lead to an increased trauma risk. Children who have an increased overjet or a protrusive/prognathic maxilla can be at risk for greater exposure of the anterior teeth leading to a greater incidence of trauma. Thus, both sex, age and physical activity as well as occlusal characteristics could influence the occurrence and distribution of TDIs among children (10).

Traumatic dental injuries are common in childhood and may have long-term physical, psychological, social and functional implications and therefore identifying their incidence within defined populations is important to inform preventive and dental health strategies. Thus, the current study is designed to evaluate the prevalence of traumatic dental injuries affecting permanent teeth in schoolchildren 6–12 years of age in Al-Najaf City, Iraq.

Materials and Method:-

In this research, a series of steps were conducted for the purpose of determining the prevalence of traumatic injuries in permanent teeth among 6-12 age school children in AL Najaf city. Approval was obtained in advance from school principals, in a manner that does not conflict with the dental ethics.

Study Design and Population:-

A cross-sectional study was conducted using questionnaire and clinical examination of the upper and lower permanent incisors. Total sample number was 600 (302 male and 298 female) selected by convenience sampling technique. At age range of 6-12 years old children who regularly attend government and private schools in Najaf City, and the study period was from October 2024 to January 2025.

Study Setting and sampling type:-

The examination was done in the private and government school. Schools included two private schools and the rest were government schools. The schools in which the clinical examination was conducted included three schools for male and three for female. All classes of students aged 6 to 12 years old were included. Then we randomly selected the classes from each level. The principal, teachers, and students were informed about the study and their consent was conducted. The research was conducted with approval from the Institutional Ethical Committee (244# in 2026).

Data Collection and clinical examination:-

The study included children whose permanent anterior teeth had erupted, or at least 3/4 of the crown had penetrated the oral cavity, and in the 6–12-year age group. Students who had lost an anterior tooth due to dental caries, broken roots, severe dental fluorosis, and children with physical, mental, or medical disabilities were excluded from the study. Children who received or had undergone orthodontic treatment were also excluded from the study. The

children were seated in a chair, and clinical examination was performed using a disposable oral mirror and a Williams probe and cotton pellet under adequate lighting. Strict infection control measures have been applied. Four trained pediatric dentists collected all information on standardized trauma assessment forms according to the diagnostic criteria. Additional details such as the cause and treatment of injury were noted for the children who underwent dental trauma. The teeth were examined by the direct vision. Neither vitality nor radiographs were used to assess the extent of the fractured teeth. The examination was uniformly performed from the maxillary right quadrant to the mandible in a clockwise direction using the Ellis and Davey trauma classification (11)



FIGURE1:A12 old girl with Avulsion of upper central and lateral incisor due to trauma.



FIGURE 2: A10 old boy with fracture of upper permanent right central incisor.

Statistical Analysis:-

Data were analyzed using IBM SPSS Statistics for Windows, version 27.0 (IBM Corp., Armonk, NY, USA). Continuous variables were presented as means ($\pm$ SD) and categorical variables as frequencies and percentages. An independent-samples t-test was used for normally distributed continuous variables for comparisons between patients with vitiligo and healthy controls.. Where appropriate categorical variables between the two groups were compared using the chi-square test.

Results:-

Results in table 1 show that regarding TDI,600 subjects participated in this study aged 6-12 years old, 6-9 years are 256 (42.67%), while 10-12 years old are 344 (57.33%), 302 male (50.33%) while 298 female (49.67%)

Table (1) Frequency and percentage of samples regarding to age and gender

Vars.		N.	%
Age (years)	6-9y	256	42.67
	10-12y	344	57.33
Gender	Male	302	50.33
	Female	298	49.67

The findings showed that among the subjects with traumatic dental injuries, those aged 6–9 years experienced more trauma than those aged 10–12 years. However, no significant difference was observed between males and females (Table 2).

Table(2) Distribution percentage of trauma according to age and gender.

		With		Free		
		N.	%	N.	%	
Age	6-9y	21	8.20	235	91.80	
	10-12y	19	5.52	325	94.48	
Gender	Male	18	5.96	284	94.04	
	Female	22	7.38	276	92.62	
Total		40	6.67	560	93.33	

The results presented below show that the most common trauma type was type II (11, 27.50%), followed by type III (10, 25.0%), type I (8, 20.0%), type IV (7, 17.50%), and type V (4, 10.0%). There was no significant association between age and trauma type. Regarding gender, females had higher frequencies of type I and type II trauma, whereas males had higher frequencies of the other trauma types. However, no significant association was observed between gender and trauma type (Table 3).

Table (3) Distribution of subjects by trauma type

Vars.	Cats.	I		II		III		IV		V		Chi Square p value
		N.	%	N.	%	N.	%	N.	%	N.	%	
Age	6-9y	3	14.3	8	38.1	6	28.6	3	14.3	1	4.8	0.414 NS
	10-12y	5	26.3	3	15.8	4	21.1	4	21.1	3	15.8	
Gender	Male	2	11.1	2	11.1	7	38.9	5	27.8	2	11.1	0.073 NS
	Female	6	27.3	9	40.9	3	13.6	3	13.6	1	4.5	
Total		8	20.00	11	27.50	10	25.00	7	17.50	4	10.00	

The findings below show that the highest percentage of trauma causes was due to falls, with 20 cases (50%), followed by sports-related injuries with 12 cases (30%), violence with 6 cases (15%), and traffic accidents with 1 case (2.50%). There was no significant association between age groups, gender, and the cause of trauma (Table 4).

Table (4) Distribution of cause of trauma

Vars.	cats	Fall		Sport		Traffic		Violence		other		Chi Square
		N.	%	N.	%	N.	%	N.	%	N.	%	
Age	6-9y	10	47.62	8	38.10	1	4.76	2	9.52	0	0	0.432 NS
	10-12y	10	52.63	4	21.05	0	0	4	21.05	1	5.26	
Gender	Male	7	38.89	8	44.44	0	0	3	16.67	0	0	0.247 NS
	Female	13	59.09	4	18.18	1	4.55	3	13.64	1	4.55	
Total		20	50.00	12	30.00	1	2.50	6	15.00	1	2.50	

In the current study, only 9 cases (22.5%) received treatment for their trauma, while 31 cases (77.5%) remained untreated. The proportion of treated cases was higher among females than males. However, there was no significant association between age groups, gender, and treatment status (Table 5).

Table (5) Distribution of treatment according to age and gender

Vars.	Cats.	Yes		No		Chi Square
		N.	%	N.	%	
Age	6-9y	6	28.57	15	71.43	0.457 NS
	10-12y	3	15.79	16	84.21	
Gender	Male	3	16.67	15	83.33	0.476 NS
	Female	6	27.27	16	72.73	
Total		9	22.5	31	77.5	

The results below show a significant association between the type of trauma and its cause. Type I, type II, and type IV trauma occurred more frequently due to falls, with 5 cases (62.50%) of type I, 7 cases (63.64%) of type II, and 4 cases (57.14%) of type IV attributed to falls. In contrast, type III trauma occurred more frequently due to sports-related injuries, with 6 cases (60%), while type V trauma was more frequently associated with violence, accounting for 4 cases (100%). (Table 6).

Table 6 Association between cause and trauma types.

		Fall		Sport		Traffic		Violence		Other		Chi Square p value
		N.	%	N.	%	N.	%	N.	%	N.	%	
Type	I	5	62.50	2	25.00	0	.00	0	.00	1	12.50	0.005 Sig.
	II	7	63.64	3	27.27	0	.00	1	9.09	0	.00	
	III	4	40.00	6	60.00	0	.00	0	.00	0	.00	
	IV	4	57.14	1	14.29	1	14.29	1	14.29	0	.00	
	V	0	.00	0	.00	0	.00	4	100.00	0	.00	

Findings below have shown that there is no significant association between type and treatment of trauma, as illustrated in (Table 7)

Table 7 Association between type and treatment of trauma.

		Yes		No		Fisher exact
		N.	%	N.	%	
Type	I	0	.00	8	25.81	0.291 NS
	II	4	44.44	7	22.58	
	III	3	33.33	7	22.58	
	IV	2	22.22	5	16.13	
	V	0	.00	4	12.90	

The current findings have revealed that the most frequently affected tooth was the maxillary right central incisor, which was affected in all cases (40, 100%), followed by the maxillary left central incisor (11, 27.5%) and the maxillary right lateral incisor (3, 7.5%) (Table 8).

Table 8 Distribution of teeth affected by trauma

	N.	%
Maxillary right Cent. Inc.	40	100.0
Maxillary left Cent. Inc.	11	27.5
Maxillary right lateral. Inc.	3	7.5

Discussion:-

Traumatic dental injury (TDI) appears to be one of the most common types of facial injuries, TDI accounts for as much as 18% of all facial injuries (12, 13). Likewise, compared with children who receive appropriate management of dental trauma and often suffer social isolation and embarrassment, those whose dental trauma is untreated are known to have a poorer oral health-related quality of life (6). In this cross-sectional study, students in primary schools between the ages of 6-12 were examined for prevalence of anterior dental trauma, of both sexes, in Najaf city. In our study, TDI found in 40 sample 6.67% of the study group, this result in agreement with the result of study done in East Delhi by Deepak et al. (14). Regarding age, the results of our study showed 6-9 years (8.2%) were more affected by TDI than 10-12 years (5.52%). This result is in agreement with results of study performed by Noor M. Kadhim (15). That showed the TDI in children between 6-9 years (17.6 %) higher than 10-12 years (7.8%). While these results exhibited disagreement with results of study conducted in India by Kanamarlapudi, et al. (16). They showed the age 8-9 years (9.9%) was less affected by TDI than 10-12 years (11%).

According to gender our results showed that there is no significant difference between male and female. These results in agreement with the results of study done in Iran by Mona Al-Shohayeb et al. in 2019 (17). While in disagreement with the results of studies (15, 16). They showed the prevalence of TDI was 33% in Females and 66% in males represent the double. Regarding type of TDI our results showed that type 2 is the highest percentage followed by type 3 then type 1. This result in agreement with the results of study done by Ghaeth Yassen et al. in 2013 in Mosul (18). While in disagreement with the result of study done in United Arab Emirates by Raghad Hashim, et al. in 2022 (19). Were the most common is type 1 followed by type 2 then type 3 as well as in disagreement with the result of study done by Deepak, et al. in 2023 (14). Regarding cause of trauma our results showed that most common cause is fall followed by sport then by violence that in agreement with results of studies done by Ghaeth Yassen, et al. in 2013; Chirine Abdel Malak in Lebanon in 2021 (18, 20). While in disagreement with study done by Vicente Rueda-Ibarra, et al. in 2022 in Mexico, (21). Were the results showed the sport is the most common followed by fall then by violence. According to treatment of TDI our results showed that untreated cases is significantly more than treated (22%) with the most treated case associated with female gender, this in agreement with results of study of Kanamarlapudi, et al. in 2022 that found only 11.8% of case received treatment (16). Lastly, our results showed, maxillary central incisor is the most affected tooth. This in accordance with results of studies (14-16).

Limitations:-

An important limitation of this study is that dental pulp vitality testing and radiographic examinations were not feasible in the school-based field setting. Thus, the evaluation was based primarily on clinical and visual examination assist, that could have limited the identification of subtle root fracture, pulpal necrosis and periapical pathology, especially in type IV and V traumatic injuries. Thus, clinically unapparent injuries or complications may have been underdiagnosed and the reported prevalence may mainly reflect only clinically detectable trauma. Weaknesses include inability of a cross-sectional design to assess for developments in complications over time. Radiographic and pulp vitality assessments, along with follow-up assessments, should be added to future studies to help characterize traumatic dental injuries. Although both public and private schools were included, the convenience sampling approach may limit the representativeness and generalizability of the findings to all primary school children in Al-Najaf city.

Conclusion:-

Traumatic dental injuries were more commonly reported among younger children than older children. Type II trauma was the most frequently encountered type, followed by Type III and Type I. Falls were the predominant cause of traumatic dental injuries. Only a limited number of affected children received treatment, with treated cases being more common among female. The maxillary right central incisor was the tooth most frequently affected by traumatic dental injuries.

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