

# Traumatic Dental Injuries and Associated Risk Factor among Sudanese School Children

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## Abstract

**Aims:** To determine the prevalence of traumatic dental injuries in the anterior segment and associated risk factors for 9 - 12 years old school children in Wad-Madani locality, Al-Gazira state, Sudan.

**Material and method:** A cross-sectional school base study for six hundred and eighty 9 - 12 years old school children (boys and girls) selected randomly from 25 basic schools. Andresen's criteria were used to record traumatic dental injuries by visual examination and no radiographs were taken. Associated risk factors were assessed (age, gender, over jet and lip Competency). Chi-square test was used to test association between the different variables. P-value < 0.05 was considered statistically significant.

**Results:** The prevalence of traumatic dental injuries was 9.1%. Boys experienced more injuries than girls 1:2.2. Enamel fracture (63%) was most common types followed by enamel and dentine fracture (27%). The maxillary central incisor was the most common affected tooth (79.7%). Collisions were the main cause of trauma and home the most common place. Most of the traumatized teeth were not treated. The high percentage of traumatized teeth associated with increased over jet (P = 0.000) and inadequate upper lip coverage (P = 0.000).

**Conclusion:** The present study revealed a relatively low prevalence of dental trauma, but still high when compared with literature. Significant association between dental trauma and associated factors (age, gender, overjet and lip Competency) were found. Educational programs should be initiated for the community regarding causes, prevention and treatment of traumatic dental injuries is mandatory to elaborate preventive strategies and efficient treatment plans.

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## Introduction

Traumatic dental injuries are worldwide spread and one of the main reasons for dental emergencies among children and adolescent<sup>[1,2]</sup>. It has impact on child quality of life, due to physical and psychological discomfort<sup>[3]</sup>. Worldwide epidemiological studies of dental trauma have been reported a wide range of prevalence 5.1% to 58.6% regardless to the type of study<sup>[4,5]</sup>. The majority of traumatic dental injuries affected the anterior teeth, especially the maxillary centrals. The common causes of dental trauma are falls<sup>[6,7]</sup>, collision with people or inanimate object, traffic accident, sports and violence<sup>[8]</sup>. Uncomplicated crown fracture was the most common type of dental injury<sup>[9]</sup>.

Number of risk factors had been attributed to traumatic dental injuries. School children aged 7-12 years and teenage are target groups<sup>[2,9]</sup>, increase overjet, and inadequate lip coverage<sup>[10]</sup>. Furthermore, boys sustain dental trauma more than girls, exhibiting significant gender differences<sup>[9,10]</sup>. The prevalence of dental trauma had been early studied among 6-12 years old Sudanese school children by Baghdadi et al and 5.1% was recorded<sup>[4]</sup>. The aim of this study was to investigate the prevalence of traumatic dental injuries and associated risk factors in Wad-Madani the second big state in Sudan.



## Material and Methods

The sample consisted of six Hundred eighty children (340 boys, 340 girls) selected from private and governmental Basic schools in Wad-Madani locality, Gazira state, Sudan. Age of the examined children ranged from 9-12 years and equally divided between age group (170 for each age group). Permission and information regarding the number of schools together with the total number of students were obtained from the Ministry of Education in order to calculate the sample size.

Twenty five primary schools (25 students from each school) were randomly selected by computer from total 225 basic schools in the locality. Then governmental and private schools were randomly selected proportionally from the selected schools (2 private and 23 governmental schools).

A permission letter explaining the purposes of the study was given to the responsible schools authority to ensure full cooperation. The list of the student from grade four to seven was obtained from the school authority. Random selection of six student in each classes were checked in the list and then clinical examination was performed by the main investigator in the teacher's office to identify the type of traumatic injury, lip relation (competent or incompetent) and the over jet.

The selected students were clinically examined in the teacher office seated in the ordinary chair in front of the investigator using natural day light. Roots fracture was not recorded as no radiographs were taken due to practical difficulties in transportation and parent's permission. Students with evidence of traumatic fracture the following examination were carried on. The traumatic dental injuries were assessed according to Andresen's criteria<sup>[11]</sup>. The over jet was examined by A metal ruler 0.01 and recorded in Millimeter, more than 3 mm was considered as risk factor according to Cavalcanti<sup>[10]</sup>. The upper lip position was considered incompetent lip when the upper lip did not completely cover the upper incisors in the resting position according to O,mullen<sup>[12]</sup> and Questionnaire concerning the causes and place of trauma had been recorded. All the students, required dental care were referred to the Pedodontics Clinic University of Al-gazira to receive the required dental care.

**Table 2:** Type of Traumatic Dental Injury among the Students (%).

Age	Gender	enamel fracture	Enamel+ dentine	Enamel+ dentine+ pulp	Intrusion	Avulsion	Total
9	Boys	4(6.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	4 (6.3%)
	Girls	2(3.2%)	3 (4.8%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	5 (7.9%)
10	Boys	5(7.9%)	3 (4.8%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	8 (12.7%)
	Girls	0(0.0%)	1 (1.6%)	1 (1.6%)	0 (0.0%)	0 (0.0%)	2 (3.2%)
11	Boys	9 (14.3%)	8 (12.7%)	2 (3.2%)	0 (0.0%)	2 (3.2%)	21 (33.3%)
	Girls	3(4.8%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (4.8%)
12	Boys	13 (20.6%)	1 (1.6%)	0 (0.0%)	1 (1.6%)	0 (0.0%)	15 (23.8%)
	Girls	4(6.3%)	1 (1.6%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	5 (7.9%)
Total	Boy & girl	40 (63.5%)	17 (27.0%)	3 (4.8%)	1(1.6%)	2 (3.2%)	63 (100.0%)

**Table 3:** Distribution of Dental Trauma According Jaw and Tooth Affected

Dental Arch	Right side		Left side		Total
	Lateral	Central	Central	Lateral	
Maxilla	5 (7.9%)	19 (30.2%)	31(49.2%)	2(3.2%)	57(90.5%)
Mandible	1(1.6%)	3 (4.8%)	2(3.2%)	0(0.0%)	6(9.5%)
Total	6(9.5%)	22 (34.9%)	33(52.4%)	2(3.2%)	63(100.0%)

## Statistic analysis

Data were collected, summarized, cleaned and coded, then entered to the Statistical Package for Social Sciences (SPSS) program (version 20). Frequency tables and descriptive statistics was done. Chi square test was used P-value of less than 0.05 was considered as significant.

## Results

The study sample consisted of 680 primary school children 9–12 year old. The overall prevalence of children with traumatized teeth was found to be 9.1%. A significant different was observed in relation to age and gender ( $P < 0.001$ ). Boys (69.35%) experienced more dental injury than girls (30.65%). The highest prevalence of traumatized teeth was observed in children aged 11 years old (Table 1).

**Table 1:** Distribution of Dental Trauma According To the Age of the Students.

Age	History of trauma		Total
	Yes	No	
9years	10 (5.9%)	160 (94.1%)	170 (100.0%)
10years	10 (5.9%)	160 (94.1%)	170 (100.0%)
11years	23 (13.5%)	147 (86.5%)	170 (100.0%)
12years	19 (11.2%)	151 (88.8%)	170 (100.0%)
Total	62 (9.1%)	618 (90.9%)	680 (100.0%)

Table 2 Showed that the simple enamel fracture/ in fracture were the most common (63.5%) type of dental injury, followed by enamel and dentine fracture (27%), complicated crown fracture (4.8%), avulsion (3.2) and intrusion was the less occurrence one (1.6%) (Table 2).

Maxillary anterior teeth were accounting (90.5%) of traumatic injuries whereas only (9.5%) in the mandibular anterior teeth. The permanent maxillary central incisors were the most common teeth affected 79.37% and the least affected teeth were the mandibular lateral incisors (1.6%) Table 3.

In regard to the causes of trauma collision was recorded the major one (53%) followed by fall (38%), violence (7%) and sport (2%). Home (70%) had been reported the most common place for trauma, followed by the school playground or classes (14%) and road (12%).

The highest percentage of traumatized children was associated with increased over jet ( $P=0.000$ ) and inadequate upper lip coverage (0.000) (Table 4,5).

**Table 4:** Distribution of Dental Trauma In Relation To Over Jet

Over jet	history of trauma		Total
	Yes	No	
Less than 3mm	23 (4.1%)	535 (95.9%)	558(100.0%)
3.5 – 5 mm	3 (28.7%)	77 (71.3%)	108(100.0%)
More than 5 mm	8 (57.1%)	6 (42.9%)	14 (100.0%)
Total	62 (9.1%)	618 (90.9%)	680 (100.0%)

**Table 5:** Distribution of Dental Trauma In Relation To Lip Competence among the Students

lip competence	history of trauma		Total
	Yes	No	
Competent lip	39 (6.3%)	585 (93.8%)	624 (100.0%)
Incompetent lip	23 (41.1%)	33 (58.9%)	56 (100.0%)
Total	62 (9.1%)	618 (90.9%)	680 (100.0%)

The majority of the children with traumatized teeth did not received dental treatment, where only 7.3% had received treatment.

## Discussion

The present study is a cross sectional, school-based study, that investigated the prevalence, cause, common type, risk factors, and treatment received of traumatic dental injuries for sample of Sudanese school children in Wad-Madani locality.

In the current study the prevalence of dental trauma was (9.1%). It was slightly high when compared with previous study among different population<sup>[4,13-15]</sup> and lower than prevalence reported by many studies<sup>[12,16-19]</sup>. This difference may be attributed to the difference in age range, methodology, diagnostic criteria as well as geographic and cultural variations in the studied populations.

When traumatized teeth studied among gender in the current study, boys were noted to have high prevalence compared to girls. This result was in agreement with most previous of the studies<sup>[4,6,12]</sup> that showed significant influence on the occurrence of dental trauma.

These results can be partially attributed to the fact that boys tend to participate more in activities with higher risk of trauma, aggressive play, games and sport<sup>[14]</sup>. However other previous studies<sup>[1,20,21]</sup>, describe no gender difference.

The risk of traumatic dental injuries in permanent anterior teeth increase with the increasing age reaches the peak at age 12 year<sup>[22]</sup>. The present Sudanese results showed traumatized teeth equality exists at age 9 year and 10 years with peak at age 11 and 12 years old.

As in previous studies, uncomplicated coronal fracture was the most common type of dental injury (63.5%) and this re-

sult was online with the studies reported by Noori and Al-Obaidi<sup>[22]</sup>, Taiwo and Jalo<sup>[23]</sup> and Murthy et al<sup>[24]</sup>.

In the current study the maxillary central incisors were the most common teeth affected by dental trauma that was in agreement with the studies reported by many authors<sup>[22-24]</sup>. Collision with objects and people was the most common cause of injury in this study. These finding was similar to that found by Traebert et al where collision was the main causative factor<sup>[25]</sup>. However, it was in disagreement with most studies where in falls was found to be the main causative factor<sup>[20,22,26]</sup>.

A clear universal system to classify causes of injury is still lacking, violence can be misinterpreted as collision, and it is difficult to classify falls during playing sports.

In relation to the place of trauma occurrences most of incidents occurred at home, in this study was in accordance to the results reported by Naidoo et al, Norri and AL-Obaidi, Rouhani et al and Adekoya<sup>[15,22,27,28]</sup>. A significant association between the dental trauma and increase overjet (more than 3mm) was recorded. Which in agreement with previous studies<sup>[29,30]</sup>. Moreover, the present result was well in agreement with previous studies<sup>[1,12,31]</sup>, where in adequate lip had been considered as a risk factors.

Treatment of traumatized teeth in the present study was noted in few cases 7.3%, were inline with previous studies worldwide<sup>[12,14,22]</sup>. No preserved treatment in this study was noted, which can be explained by the fact that the common types of trauma in the anterior teeth were simple enamel fractures/enamel and dentine fractures without pulp involvement.

## Conclusion

Dental trauma among Sudanese school children aged 9-12 years was 9.1%. A statistic significant difference was noticed between traumatized anterior teeth and age, gender, over jet and inadequate lip.

Further studies for larger sample size and wide range of age groups in different area in Sudan are recommended in order to the overview the prevalence and etiological factors of traumatized anterior teeth and to investigate the personal and social factors that may increase the risk of traumatized anterior teeth. In the Sudanese community is obligatory to intricate preventive strategies and proficient management approach that can minimize their impacts.

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