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A Retrospective Study of Dento-alveolar Injuries of Children in Ankara, Turkey

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Abstract

Information concerning age and sex distribution, etiology, types, place and extent of trauma as well as seasonal variations, time difference between traumatic injury and seeking of dental care and number of traumatic injuries was recorded retrospectively from 150 patients. The study comprised 91 boys and 59 girls representing 246 dental injuries and 332 injured teeth (72 primary and 260 permanent teeth). The most common injuries were uncomplicated crown fracture (23.57%), subluxation (15.85%), avulsion (10.16%), lateral luxation (9.75%), complicated crown fracture and intrusion (8.4% and 8.94%, respectively). The occurrence of uncomplicated crown fractures was significantly higher ($P<0.05$) in the 10–12 years age group than other age groups. Lateral luxation and intrusion were significantly higher in the 1–6 and 7–9 years age groups ($P<0.05$, respectively).

Dental injuries have been classified according to a wide variety of factors, and studies from different countries show that the prevalence of these injuries ranges from 6% to 37% (1-5). The causes and types of dento-alveolar traumatic injury may differ according to the material investigated, but seem to be related to the place of treatment, hospital material producing the more severe injuries (1, 3, 4, 6, 7).

Epidemiologic investigations report a high incidence of dental injuries related to accidents within and around the home for the primary dentition and to accidents at home and school for the permanent dentition (1, 2, 6, 8). Most dental injuries involve the anterior teeth and usually affect a single tooth, though certain trauma types favor multiple injuries (1, 3-7, 9, 10). Most reports note a precise sex and age distribution and seasonal variations (1, 3-7, 9, 10).

The purpose of the present study was to identify the etiology and type of dento-alveolar injuries in a University Dental Clinic and to provide a basis for determination of optimal treatment approach and educational needs.

Material and methods

The patient material was collected from the Pediatric Dentistry Department of Hacettepe University Dental Faculty between 1996 and 2000, and comprised 150 children aged 1–16 years. Information regarding age, sex, etiology, type, place, number and extent of traumatic injuries, as well as seasonal variations, time difference between trauma and seeking of dental care were recorded retrospectively. Andreasen's (11) classification of hard dental and periodontal tissue injuries was used with the following diagnostic criteria:

- Crown infraction
- Uncomplicated crown fracture
- Complicated crown fracture
- Uncomplicated crown – root fracture
- Complicated crown – root fracture
- Root fracture
- Concussion
- Subluxation
- Lateral luxation
- Extrusive luxation
- Intrusive luxation
- Exarticulation (avulsion)

Statistical analysis was carried out by Chi-square test with the significance level set as $P < 0.05$.

Results

The study comprised 91 boys and 59 girls, representing 332 injured teeth, 72 primary and 260 permanent teeth. Patients' mean age was 8.3 years (8.1 years for boys and 8.6 years for girls). Male sex predominated through all age groups; the difference, however, was not statistically significant ($P > 0.05$) (Figure 1).

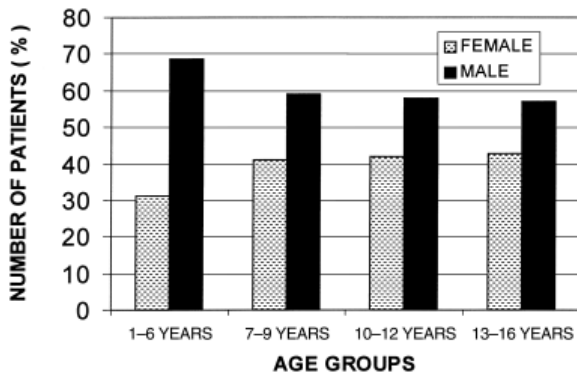


Figure 1 Distribution of age groups by gender.

The injuries observed took place in the street and home playground (45.3%), school and school playground (30.7%), home (19.3%) and other places (4.7%). No statistical significance was found between sex and locations of injury ($P > 0.05$, respectively) (**Figure 2**).

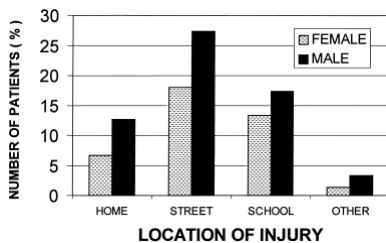


Figure 2 Location of traumatic injury by gender.

The etiology of the injuries is presented in **Figure 3**: 42.7% were from falls, 18% from being hit, 16% from sports accidents, 14.7% from collisions, 4% from fights, 3.3% from traffic accidents and 1.3% due to other events. No statistical difference was observed between sexes concerning the etiology ($P > 0.05$, respectively).

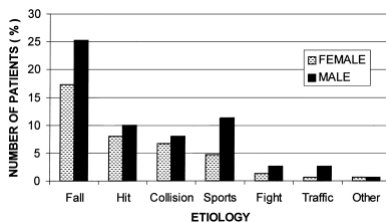


Figure 3 Etiology of traumatic injuries by gender.

A slight, but statistically insignificant ($P > 0.05$), difference was observed between spring/summer and winter/autumn (54% and 46%, respectively).

The amount of time elapsed between traumatic injury and patients' seeking dental care (time difference) varied as follows: 0–24 h (48%), 1–7 days (26%), 1–4 weeks (12.7%), 1–6 months (9.3%) and more than 6 months (4%). The relation between all types of traumatic injuries and the time elapsed before the treatment was sought (time difference) was found to be statistically insignificant ($P > 0.05$).

The types of injury observed are summarized in **Figure 4**. The most common injuries in children were uncomplicated crown fracture (23.57%), subluxation (15.85%), avulsion (10.16%), lateral luxation

(9.75%), and complicated crown fracture and intrusion (8.4% and 8.94%, respectively). Patients with primary dentition mostly suffered from luxation injuries such as subluxation, avulsion and lateral luxation (26.38%, 23.61% and 20.83%, respectively). Those with permanent dentition mostly had uncomplicated crown fractures, subluxation and avulsion injuries (31.15%, 15% and 10.38%, respectively).

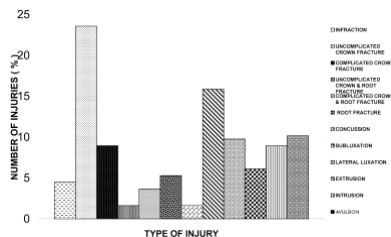


Figure 4 Distribution of the types of injury observed in the study.

In this study, it was observed that most of the traumatic injuries involved the maxilla (141 cases); the mandible was affected in three cases and both jaws were involved in six. As regards the extent of trauma, a single injury occurred in 52.66% of all children, while two (32%), three (14%) and four (1.33%) types of injury occurred in the rest.

The tooth-specific distribution of dento-alveolar injuries is summarized in **Table 1**. The distribution of injured teeth showed that 90.36% of all traumatized teeth were maxillary incisors. Maxillary primary and permanent incisors accounted for 86.11% and 91.53% of all traumatized primary and permanent teeth, respectively.

Table 1. Tooth-specific distribution of traumatic injuries

Traumatic injury	11		12		21		22		51		52		61		62	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Infraction	8	7.48	0	0.00	7	6.80	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Uncomplicated crown fracture	34	31.77	3	20.00	33	32.04	4	30.77	0	0.00	0	0.00	0	0.00	0	0.00
Complicated crown fracture	10	9.35	1	6.67	12	11.65	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Uncomplicated crown & root fracture	0	0.00	0	0.00	3	2.91	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Complicated crown & root fracture	5	4.67	0	0.00	3	2.91	0	0.00	1	4.76	0	0.00	0	0.00	0	0.00
Root fracture	5	4.67	0	0.00	8	7.77	1	7.69	0	0.00	0	0.00	1	4.00	0	0.00
Concussion	2	1.87	1	6.67	1	0.97	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Subluxation	15	14.02	3	20.00	12	11.65	4	30.77	6	28.57	2	28.57	9	36.00	1	11.11
Lateral luxation	10	9.35	0	0.00	7	6.80	1	7.69	7	33.33	1	14.29	5	20.00	1	11.11
Extrusion	4	3.74	3	20.00	4	3.88	0	0.00	1	4.76	0	0.00	2	8.00	1	11.11
Intrusion	5	4.67	2	13.33	4	3.88	2	15.39	4	19.05	2	28.57	4	16.00	1	11.11
Avulsion	9	8.41	2	13.33	9	8.74	1	7.69	2	9.53	2	28.57	4	16.00	5	55.56
Total	107	100.00	15	100.00	103	100.00	13	100.00	21	100.00	7	100.00	25	100.00	9	100.00

As regards the relation between trauma type and age, children in the 7–9 years age group had the highest rate of traumatic injury (41.05%). There was a significantly higher occurrence of uncomplicated crown fractures in the 10–12 years age group ($P<0.05$). Lateral luxation and intrusion were observed significantly more often in the 1–6 years and 7–9 years ($P<0.05$, respectively). The distribution of types of injury related to age groups is given in **Table 2**.

Table 2. Distribution of types of injury related to age groups

Traumatic Injury	1–6 years		7–9 years		10–12 years		13–16 years		Total	
	n	%	n	%	n	%	n	%	n	%
Infraction	1	9.09	5	45.45	4	36.36	1	9.09	11	100
Uncomplicated crown fracture	1	1.72	23	39.65	32	55.17	2	3.45	58	100
Complicated crown fracture	2	9.09	8	36.37	11	50.00	1	4.54	2	100
Uncomplicated crown–root fracture	0	0.00	2	50.00	1	25.00	1	25.00	4	100
Complicated crown–root fracture	1	11.11	2	22.22	6	66.67	0	0.00	9	100
Root fracture	1	7.69	3	23.08	6	46.15	3	23.08	13	100
Concussion	2	50.00	1	25.00	1	25.00	0	0,00	4	100
Subluxation	13	33.33	15	38.46	11	28.21	0	0,00	39	100
Lateral luxation	11	45.83	11	45.83	2	8.34	0	0,00	24	100
Extrusion	2	13.33	8	53.34	3	20.00	2	13.33	15	100
Intrusion	10	45.45	11	50.00	1	4.55	0	0,00	22	100
Avulsion	7	28.00	12	48.00	5	20.00	1	4.00	25	100
Total	51	20.73	101	41.05	83	33.73	11	4.47	246	100

Discussion

Traumatic injuries in children and adolescents are a common problem. In the last decade, a number of studies have attempted to examine the trauma problem on a population basis (**2, 3, 5-8, 10**). It appears that gender, age and trauma history are important predisposing factors that increase the risk of dental trauma (**12**).

Prevalence rates in children differ in various investigations (**5-7, 10, 13**). However, though confirming the observations, the present material points to a higher prevalence in 7–9-year-olds (41.05%) than in other age groups. This may be due to the higher number of injuries referred to the pediatric dentistry department. In disagreement with other studies, we were not able to find significant differences between males and females (**3-5, 7, 10**).

The etiology of injuries in the present sample was in disagreement with earlier reports (**1, 6, 8**): altogether, 45.3% of all the injuries were recorded as having taken place at home and in the street playground, 30.7% at school/in the school playground and 19.3% at home. The high number of injuries sustained at home/in the street playground may be explained by seasonal variations (slightly higher in

summer/spring) as children play outside home or school in these seasons. There was no statistically significant relation between age/gender and place of injuries ($P > 0.05$). Accidents due to falls appear to be the most common factor in all age groups in this study (42.7%). The other highest etiologic factors were being hit, sports accidents and collisions (18%, 16% and 14.7%, respectively).

Previous clinical observations have denoted the same trend as this study (4-8, 14). However, disagreement exists between the results of previous studies and this study's, as we could not find a significant relationship between gender and etiology of traumatic injuries (1, 14).

The material collected in the present study covered a wide spectrum of injuries but the most common injury to the permanent teeth was uncomplicated crown fracture and periodontal tissue injuries (subluxation, avulsion and lateral luxation) to the primary teeth. A high occurrence of periodontal tissue injuries such as lateral luxation and intrusion in children under 9 years old in this study is mainly due to the resilience of alveolar bone in that age group. (15). These results agree with earlier reports (1, 4, 5, 7). The compact characteristic of alveolar bone at older ages explains the cause of high prevalence of root fractures in 13–16-year-old children in this study.

It has been shown in earlier investigations that maxillary incisors, especially central incisors, are the teeth most often traumatized (1, 3-5, 7, 10). The present material also shows more of a predominance of traumatized maxillary primary and permanent incisors (86.11% and 91.53%, respectively).

The number of injuries per patient in the present study is 1.97. This rate has been reported to vary from 1.1 to 2 in previous reports (4, 7). Single injury was the most common type in this study (52.66%).

Epidemiologic data observed in our sample were in accordance with most studies dealing with traumatic injuries and may help to explain the complexities of dental trauma epidemiology and ultimately reduce the increasing frequency of dental trauma.

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