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Dental trauma in children and young adults visiting a University Dental Clinic

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Abstract – The aim of the study was to present the distribution of traumatic dental injuries in the permanent anterior teeth in 447 consecutively selected patients in the age interval of 6 to 25 years treated at the Department of Paediatric Dentistry at the University Dental Clinic in Rijeka, Croatia, in the period from 2001 to 2006. Data on age, gender, number of injured teeth and type of injury were taken from the dental records. Of all 447 consecutively selected patients with traumatic dental injury 56.2% were boys and 43.8% were girls with a male/female ratio 1.28:1 ($P < 0.01$). The highest frequency of tooth injuries occurred among 10- to 13-years-old children. Among 30.6% of the cases, two or more teeth were injured (38.6% in boys and 21.4% in girls). Traumatic injuries affecting teeth in the upper jaw were more frequent ($P < 0.001$). The most commonly affected teeth were the maxillary central incisors (42.4% of right central incisors and 38% of left central incisors). The most frequent injury was enamel and dentin fracture without pulpal involvement (38.7%). In conclusion, more attention should be paid to preventive measures.

A majority of dental injuries happen in children. Traumatic injuries of permanent teeth can appear rather severe, particularly when associated with trauma to supporting tissues (1).

As suggested by Andreasen and Andreasen, traumatic dental injuries can compromise dental health and lead to aesthetic, psychological, social and therapeutic problems (2).

The distribution of traumatic dental injuries varies in different periods of life. The most frequent traumatic dental injuries occur between 2 and 4 years and between 8 and 10 years of age in both genders (3–8).

A majority of traumatic dental injuries involve only one permanent tooth and the most frequently affected are the maxillary central incisors (7, 8). The most frequent types of traumatic dental injuries to permanent teeth are enamel fractures, enamel and dentine fractures (9) and enamel and dentine fractures with pulpal involvement (8).

The aim of the study was to present the distribution of traumatic dental injuries to permanent anterior teeth in 447 children and young adults visiting the University Dental Clinic in Rijeka, Croatia.

Material and methods

The study was performed on 447 consecutively selected patients (196 girls and 251 boys) who were all visiting the University Dental Clinic in Rijeka, Croatia, during the period from 2001 to 2006.

The age of the examined patients ranged from 6 to 25 years and only patients with traumatic dental injuries of the permanent teeth were included in the study.

Information on age, gender, number and type of injured permanent teeth, as well as the type of traumatic dental injury was taken from the dental records. Radiographic examination was performed to confirm the diagnosis.

Classification of traumatic dental injuries as proposed by the WHO and modified by Andreasen & Andreasen (10, 11) was applied.

The study was reviewed and approved by the Ethical Committee of the Faculty of Medicine, University of Rijeka, Croatia.

Statistical analyses were performed using personal computers and the Microsoft program 'Excel 5.0/7.0' and for further statistical analysis SPSS statistical package version 10 (SPSS Inc., Chicago, IL, USA) was used.

Results

In 447 examined dental trauma patients, traumatic dental injuries to the permanent anterior teeth were diagnosed in 251 boys (56.2%) and 196 girls (43.8%). The male/female ratio was 1.28:1 and was statistically significant ($P < 0.01$).

The highest frequency of teeth injuries occurred among 10 to 13-year-old children (Fig. 1).

A statistically significant difference in traumatic dental injuries was found in relation to gender and age. As to gender, a statistically significant difference was found among boys in the groups of 6–9, 14–17 and 18–21 years of age ($P < 0.05$). There was no significant gender difference in the age intervals of 10–13 and 22–25 years old.

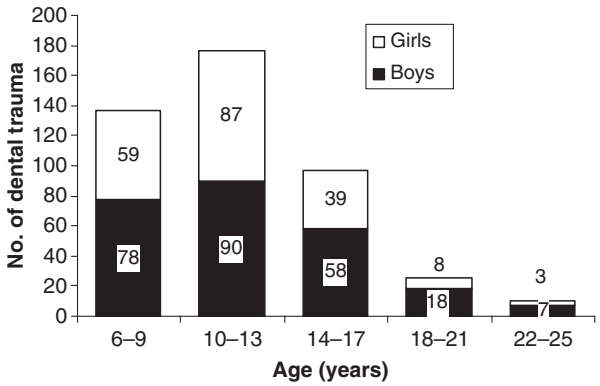

Fig. 1. Distribution of traumatic dental injuries in relation to age and gender.

A single tooth injury was found in 69.4% of all cases. Only one traumatized tooth was found in 79.6% of girls and 61.4% of boys ($P < 0.001$) (Table 1).

Almost twice as much boys (38.7%) in comparison with girls (20.4%) were represented with two or more injured permanent teeth (Table 1).

From all the examined permanent anterior teeth in the consecutively selected groups of patients, 608 were diagnosed as traumatized: 544 (89.5%) in the upper and 64 (10.5%) in the lower jaw. Traumatic dental injuries affecting permanent teeth in the maxilla were more frequent and statistically significant ($P < 0.001$).

The permanent teeth most frequently affected by traumatic dental injuries were the maxillary central incisors (42.4% of the cases involving the right central incisors and 38% of the cases involving the left central incisors) (Fig. 2).

The most frequent injuries were enamel and dentin fractures without pulpal involvement (38.7%), followed by enamel fractures (37.2%). The most common type of periodontal tissue injuries were lateral luxation (4.3%) and subluxation (1.9%) as shown in Table 2.

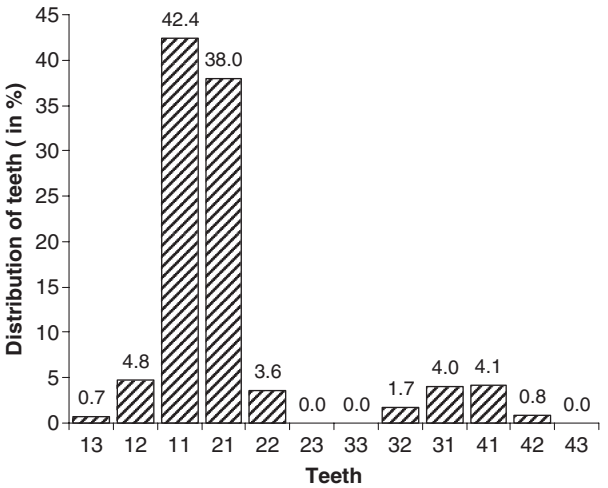

Fig. 2. Distribution of traumatic dental injuries in relation to affected permanent teeth.

Table 2. Distribution of specific type of injury

Classification	*n* (%)
Enamel fracture	227 (37.2)
Enamel and dentin fracture without pulpal involvement	236 (38.7)
Enamel and dentin fracture with pulpal involvement	88 (14.4)
Crown-root fracture without pulpal involvement	0 (0.0)
Crown-root fracture with pulpal involvement	4 (0.7)
Root fractures	9 (1.5)
Concussion	1 (0.2)
Subluxation	12 (1.9)
Intrusive luxation	1 (0.2)
Extrusive luxation	1 (0.2)
Lateral luxation	26 (4.3)
Avulsion	5 (0.8)

Discussion

According to the results of this study, boys are more prone to traumatic dental injuries. The male/female ratio is in accordance with the results represented in the recent literature showing that the ratio varies from 1.4:1 to 3:1 (11–20).

The peak incidence of traumatic dental injuries we found does not significantly differ from the results obtained in the recent literature, representing the highest occurrence in the age interval of 9 and 14 years of age (12, 13, 18, 21, 22).

Children are usually more active in this period of life and often lack motoric coordination because of their developmental stage (14). For this reason, they cannot often precisely evaluate velocity and danger. As they grow up, proneness to traumatic dental injuries significantly reduces because of the decrease in predisposing factors indicated above (23, 24).

This extended period of children's proneness to traumatic dental injuries in the early school age and adolescence may be explained by temper and/or individual psychosocial differences, which result from the different lifestyles specific for certain social and cultural backgrounds (25–28).

Considering the number of the injured teeth, the results of this study are similar to those of some recent studies (10–12, 16, 22, 29–31).

According to the results of this study, the incidence of two or more injured teeth is almost two times more frequent in boys than in girls. A possible cause of boys'

Table 1. Number of injured permanent teeth per patient

No. of injured teeth	Cases of injuries, *n* (%)		
	Boys	Girls	Total
1	154 (61.4)	156 (79.6)	310 (69.4)
2	82 (32.7)	37 (18.9)	119 (26.6)
3	11 (4.4)	2 (1.0)	13 (2.9)
4	3 (1.2)	1 (0.5)	4 (0.9)
5	1 (0.4)	0 (0.0)	1 (0.2)
Total	251 (100)	196 (100)	447 (100)

higher proneness to traumatic dental injuries could be their involvement in more aggressive sports, as well as their more violent behaviour (11–13, 15, 18, 21, 22). The results accounting for three and four injured teeth found in the same patient represent the findings different from the results obtained in the study of Kowash et al. (16).

Although the represented number seems to be pretty low, even 6% of boys and 5% of girls were found to have three traumatized teeth, as well as 3% of boys with four traumatized teeth.

As to the type of the traumatized teeth, the results representing the highest percentage of the traumatized upper central incisors show similarities between our sample and some other European countries (11, 15).

A study performed in Italian population showed that the upper central incisors were involved with a lower percentage of traumatic dental injuries (74.6%) in comparison with the results obtained in this study (13) (Fig. 2). This lower percentage found among Italian children in relation to the percentage represented in our sample could be explained by a narrower age interval of patients involved in the Italian study, including 6 to 11-year-old children.

Accordingly, in comparison with some other European countries, the percentage of traumatic dental injuries of the upper lateral incisors is also slightly lower in the present sample (11, 13, 15). An explanation could be found in different extrinsic (socioeconomic indicators and family life) and intrinsic (social and cognitive skills and behaviour) factors (27), which may influence a child's predisposition for the dental injuries in certain periods of life. Some children are more prone to repeated and/or more severe traumatic dental injuries according to their psychophysical predisposition, but this needs to be further investigated (31, 32).

In general, high percentage of traumatic dental injuries to the maxillary teeth can be explained by the prominence of these teeth. The maxillary central incisors are sometimes in a protrusive position and often inadequately covered by the upper lips, which could possibly amortize the strike (33, 34). Unlike the lower teeth and the canines, the latter, considered as the strongest teeth in the jaw, are usually better protected by the lips and not so prone to injury (24, 33–36). Moreover, the upper jaw is rigid and the lower jaw is movable, which additionally contributes to the predisposition of certain teeth to injury.

The results of this study favour a 10 to 13-year-old boy with enamel and dentin fracture to a single upper central incisor without pulpal involvement. When it comes to multiple traumatic injuries, the upper teeth are usually more affected. Moreover, the most common types of dental injuries affecting hard tissue are enamel and dentin fractures without pulpal involvement.

Conclusion

Preventive measures regarding evaluation of possible psychosocial factors involved in the aetiology of traumatic dental injuries should be taken into further consideration. More attention should be paid to preventive measures, which includes wearing mouthguards, especially in the early stages of psychophysical growth of male population.

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