Prevalence of Trauma to Anterior Teeth Among Schoolchildren Living Diyarbakır

Diyarbakır'da Yaşayan Okul Çağındaki Çocuklarda Kesici Dişlerdeki Yaralanmaların Yaygınlığı

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ABSTRACT Objective: This study assessed the prevalence of trauma to the anterior teeth in 256 schoolchildren ranging age from 6 to 17 years treated at the dental clinics of Dicle University School of Dentistry, in Diyarbakır, between May 2003 and May 2005. **Material and Methods:** Age and genders of patients, the locations and type of traumatized teeth, and types of trauma were recorded, and injures were classified according to the criteria of Andreasen. **Results:** Males had more injuries resulting from sports, traffic accidents, and violence than females; in females, the main cause was falls, especially "falls from the roof." The most common injuries were uncomplicated crown fracture (55.4%), root fracture (8.6%), complicated crown fracture (5.5%), luxation (4.3%), and avulsion (2.0%). The occurrence of uncomplicated crown fractures was significantly higher ($P<0.05$). **Conclusion:** Our findings suggest the importance of encouraging parents to visit professional dental institutions with their children soon after the injury. Moreover, for specific age groups, the etiologic factors of dental injuries are closely related to lifestyle, especially in economically deprived communities.

Key Words: Trauma, dental injury, epidemiology, prevalence

ÖZET Amaç: Bu çalışmada Dicle Üniversitesi Diş Hekimliği Fakültesinde 2003 Mayıs ve 2005 Mayıs tarihleri arasında tedavi edilen 6–17 yaş grubundaki 256 okul çocuğunda anterior dişlerde travmanın yaygınlığı değerlendirilmiştir **Gereç ve Yöntemler:** Olaylarda yaş ve cinsiyet, travmaya uğramış dişin lokalizasyonu ve tipi, travma ve yaralanma şekli Andreasen kriterlerine göre sınıflandırılmıştır. **Bulgular:** Yaralanmalar erkek çocuklarda daha çok trafik kazaları, sportif ve şiddet olaylarında, kız çocuklarda ise daha çok düşmeden özellikle damdan düşme olaylarından kaynaklanmıştır. En yaygın yaralanmaların sırasıyla; komplike olmayan kron kırığı (%55.4), kök kırığı (%8.6), komplike kron kırığı (%5.5), lüksasyon (%4.3), ve avulsiyon (%2.0) olduğu tespit edilmiştir. Komplike olmayan kron fraktürü istatistiksel olarak anlamlı biçimde yüksek olduğu görülmüştür($P<0.05$). **Sonuç:** Bulgularımız doğrultusunda çocuklardaki dental yaralanmalardan sonra ebeveynleri tarafından profesyonel dental tedaviye yönelmelerini önermekteyiz. Buna ilaveten, dental yaralanmalar yaş grupları etiyolojik faktörler, yaşam biçimiyle özellikle ekonomik durumla yakından ilişkilidir.

Anahtar Kelimeler: Travma, dental yaralanma, epidemiyoloji, yaygınlık

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Dental injuries cause a major problem affecting many aspects of a patient's life. The majority of dental injuries involve the anterior teeth, which may restrict biting, affect speech, and cause embarrassment when smiling and showing the teeth.[1,2] Such injuries commonly result from

falls, sport activities, motor vehicle accidents, and violence.[3-5] A risk exists of a patient developing problems with self-image and self-acceptance.[6] Since injuries to the teeth structures can potentially result in severe disfigurement, psychological disturbances, and functional problems,[7] such injuries in children often lead to the development of abnormal psychosocial behavior and are of great concern not only to the patients, but also their parents.[8]

The prevalence of dental trauma differs considerably in various epidemiologic studies, and can have different etiologic factors in different parts of the world or even within the same country. Although numerous studies on dental trauma have been conducted in Turkey,[5, 9-12] no information exists on the risk factors for dental trauma in the Southeastern Anatolia region, which is predominantly rural. Since people in this region are not well informed about the risks of such injuries, they do not seek professional help, which results in various complications, including pulp necrosis, pulp obliteration, tooth discoloration, periapical lesions, external root resorption, ankylosis, and the loss of marginal bone support.[13,14]

This study sought to clarify the etiology and type of dental injuries in the city center of Diyarbakır, in Southeastern Anatolia, and investigated the tendency for people to seek various treatment alternatives for traumatized teeth.

MATERIAL AND METHODS

This study was carried out in the clinics of School of Dentistry Dicle University in Diyarbakır City, one of the biggest centers in predominantly rural Southeastern Anatolia. Moreover, due to migration from rural to urban centers, much of the population lives in suburban districts.

The study population was randomly selected from the patients applying for dental treatment to the pedodontics clinic of Dicle University Dental School between May 2003 and May 2005. The age range of the children was from 6 to 17 years. Information regarding age, gender, the etiology, type, location, number, and extent of the injury, and the time between the injury and seeking dental care were recorded retrospectively. Concerning the etiology of the injuries, the main causes were as follows: falls, being hit, collisions sports, traffic accidents, and violence. During this process, an unusual kind of fall was noted as an etiologic factor. Customarily, people living in the rural parts of this region sleep on the roofs of specially designed houses. These houses are made from a kind of mud, and usually have only a single floor and a flat roof. This traditional architecture, which has been in use for nearly 1,000 years, keeps the house cool in summer and warm in winter. However, this unusual sleeping custom can have dangerous consequences, especially in summer. Many sleeping children fall off the roof, injuring their legs, arms, and head. Of the head wounds, mandibular fractures are prevalent, and are accompanied by cracked teeth. For this reason, in our study, "falls from the roof" were distinguished in the falls group.

Except for the treated teeth, all the traumatized incisors were diagnosed in a standardized manner by two dentists using a dental mirror and probe. To increase the accuracy of diagnosis, the teeth were dried before examination using gauze squares. Fractures of the crowns of teeth, ranging from chipped teeth to fractures extending into the pulp, were observed, and trauma involving the maxillary and mandibular permanent incisors was classified according to *Andreasen.*[14] During the clinical exam, the fracture, exposed pulp, abnormal mobility, and direction of displacement (concussion, subluxation, extrusive luxation, lateral luxation, intrusive luxation, or avulsion) were also recorded.

The data were subsequently processed and analyzed using version 10.0 of SPSS for Windows (SPSS, Chicago, IL, USA) and the level of significance was set at 5%. Statistical analysis included both descriptive statistics and the chi-square test.

RESULTS

Over the 2-year period from May 2003 to May 2005, 256 trauma patients (135 males) were diagnosed. The ages of the patients ranged from 6 to 17 years (mean age 11.31 ± 2.36 years). More males were studied, but the difference was not significant

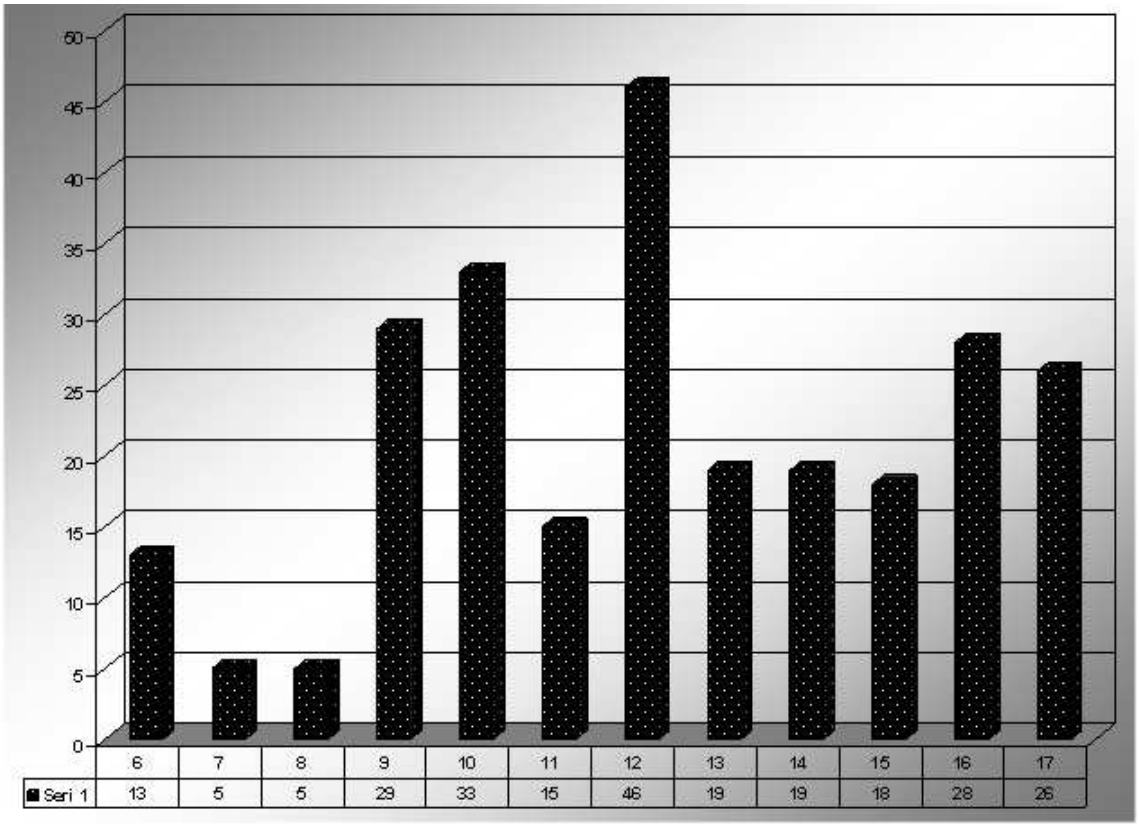

FIGURE 1: The distribution of patients according to ages.

(*P*>0.05). Furthermore, although boys experienced more injuries than girls did, the difference between the genders was not significant. Interestingly, however, the most trauma occurred at age 12 for both genders (Figure 1).

The distribution of the injuries in terms of the etiology was summarized in Table 1. The main causes of tooth injury were falls (32.4%), collisions with objects (21.9%), sports (19.9%), traffic accidents (16.0%), and violence (9.8%). A statistically significant association was observed between gender and the cause of injury (*P*<0.05). Falls and collisions were the main causes of injury in males and females, respectively. Males had more injuries from sports, traffic accidents, and violence than females; in females, the main cause was falls, especially "falls from the roof."

The maxillary right central incisor was the most commonly injured tooth (44.9%), followed by the left central incisor (36.3%), right central (9.0%), and left lateral (3.5%). The maxillary arch was involved in a higher percentage of trauma cases (94.5%). Mandibular incisors were less frequently injured (3.5% for central incisors and 2.0% for lateral incisors) (Figure 2).

Uncomplicated crown fractures including the enamel/dentin (32.0%) and enamel alone (23.4%) were the most common injuries in children irrespective of the gender, followed by fractures in the

TABLE 1: Distribution of patients by gender and etiology of dental fracture.

Gender	Fall N (%)	Collision N (%)	Sport N (%)	Traffic accident N (%)	Violence N (%)	Total N (%)
Male	30 (22.4)	26 (19.4%)	33 (24.6%)	23 (17.2%)	22 (16.4%)	134 (52.3%)
Female	53 (43.4%)	30 (24.6%)	18 (14.8%)	18 (14.8%)	3 (2.5%)	122 (47.7%)
Total	83 (22.4%)	56 (19.4%)	51 (24.6%)	41 (17.2%)	25 (16.4%)	256

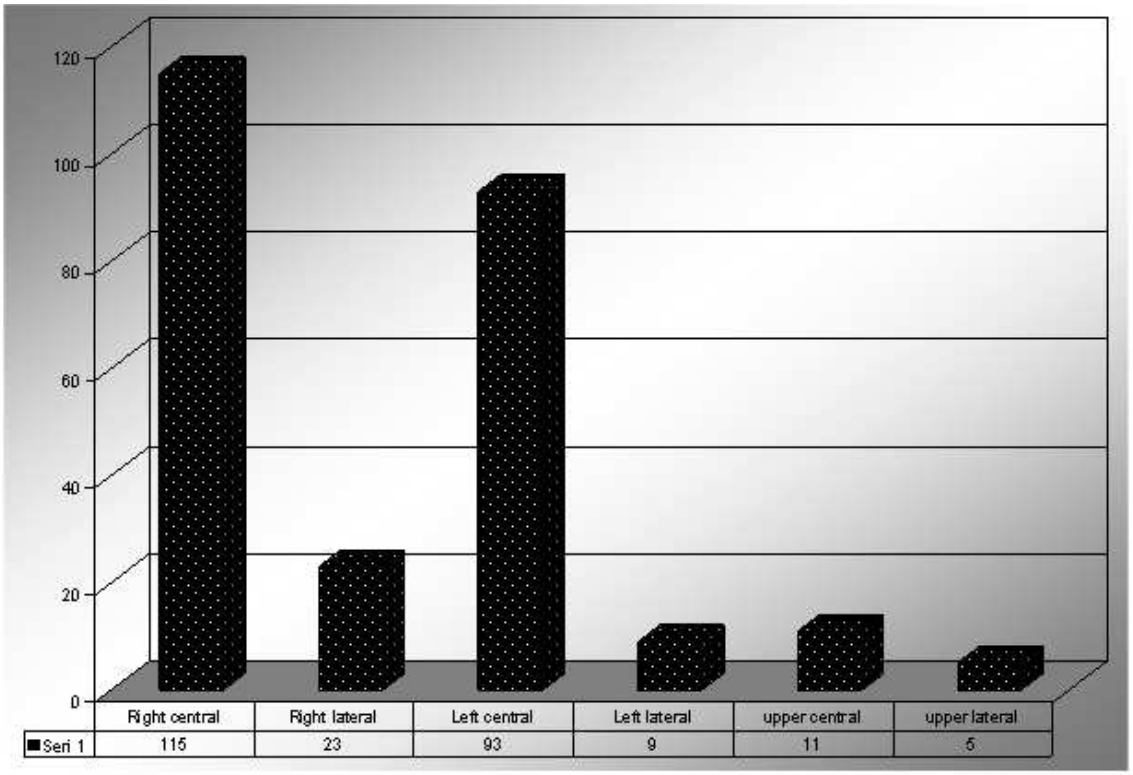

FIGURE 2: The distribution of injuries according to the tooth affected.

enamel/dentin with pulp exposure (24.2%), root fracture (8.6%), crown-root fracture (5.5%), luxation (4.3%), and avulsion (2.0%) (Table 2). No statistical difference was found between gender and type of fracture (P>0.05).

Figure 3 shows the distribution of injured teeth according to the treatment procedure. Acid-etch composite was the most frequent therapy (37.5%) and the least often observed treatment was apical surgery (1.2%). Unfortunately, most of the children who had experienced dental trauma to the teeth reported that they were not taken to the dentist for evaluation or treatment of the injured teeth. Forty-three (16.8%) of the traumatized teeth were never treated, and 67 teeth (26.2%) required root canal treatment. Eight traumatized teeth (3.1%) were extracted. Fourteen avulsed teeth (5.5%) were replaced by prosthesis. Seven teeth (2.7%) were reimplanted by a general dentist in an emergency appointment. Thirteen teeth (5.1%) were splinted and five teeth

TABLE 2: Frequency distribution of dental injuries according to the classification of Andreasen and Andreasen.

	Right central	Right lateral	Left central	Left lateral	Upper central	Upper lateral	Total N (%)
Enamel fracture	28	8	18	3	3	-	60 (23.4%)
Enamel and dentin fractures	39	4	39	-	-	1	83 (32.0%)
Enamel and dentin fractures with pulp exposure	24	3	21	5	6	4	63 (24.2%)
Root fracture	9	7	5	1	-	-	22 (8.6%)
Crown-root fracture	3	-	8	-	2	-	13 (5.5%)
Luxation injuries	9	1	-	-	-	-	10 (4.3%)
Avulsion	3	-	2	-	-	-	5 (2.0%)

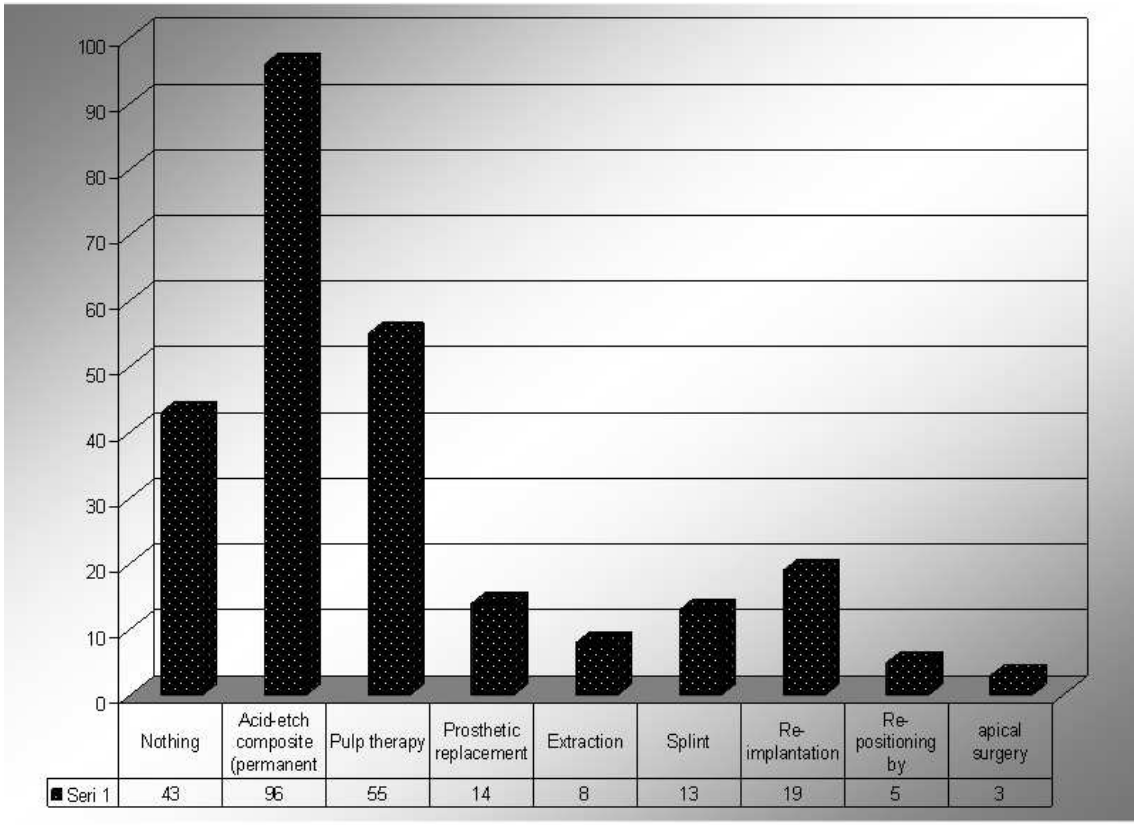

FIGURE 3: The distribution of treatments for the injured teeth.

(2.0%) were repositioned using an orthodontic device. No statistical difference was found between gender and type of treatment (P>0.05).

DISCUSSION

Dental injuries may cause functional, communication, aesthetic, and psychosocial difficulties in a developing child.[15] A child with a dental fracture may have problems with phonation and mastication.[3] In addition, injuries to the teeth structures can potentially result in aesthetic problems.[10, 2] Dental injuries may initially be ignored and consequently not treated or have treatment delayed because the patients are usually unaware of the risk in delaying therapy for injured teeth.[16] In this study, our main purpose was to clarify the etiology of dental injuries in a city in Southeastern Anatolia, where the residents live a traditional lifestyle and a great number of people have emigrated from rural districts in the same region over the past 25 years.

With respect to gender, no difference was detected between the sexes. While this accords with the results for 116 12-year-old Brazilian schoolchildren, it is inconsistent with previous epidemiologic studies in Turkey.[9] In those studies, males were more prone to dental injuries than females. This may result from age differences among the child populations and reflects the fact that older males are much more physically active than older females.

Interestingly, in our study, dental trauma was most prevalent at the age of 12 years in both sexes. This observation paralleled with a study by *Altay and Gungor*,[9] who found a significantly higher occurrence of uncomplicated crown fractures in the 10-12-year-old group for 150 Turkish children aged 1-16 years living in a city center in Middle Anatolia (P<0.05). Similarly, a study of patients between 6 and 15 years old by *Caldas and Burgos*[17] in Brasilia found that 50.8% of the dental trauma occurred at the age of 12 years.

As already noted, males had more injuries resulting from sports, traffic accidents, and violence than females, while the main cause in females was falls, especially "falls from the roof." These results are in line with a previous study in a city center in Eastern Anatolia, which is similar to our region. The authors of that study found that fights and violence were the most common etiologic factors in males, while most females were injured in falls.[5] However, none of the studies reported in any of the international journals have distinguished "falls from the roof." In Middle Anatolia, *Altay and Gungor*[9] found no statistical difference between the sexes with regard to etiology ($P<0.05$), which may have been due to the more modern lifestyle in that city center compared to our region. These differences among three studies clearly show that within a specific age group, the etiologic factors of dental injuries are closely related to lifestyle, especially for economically deprived communities.

In our study, the most commonly affected teeth were the maxillary central incisors. *Castro et al.*[18] also observed that most dental trauma involved the maxilla (505 cases), while the mandible was affected in 100 cases. This observation was also similar to the results of *Zuhal et al.*[12] and *Şaroglu and Sonmez.*[10]

Our results clearly show the lack of information about dental trauma in Southeastern Anatolia. Although the majority of the patients had crown fractures without pulpal involvement (56.2%), the patients often delayed visiting a dental clinic for treatment, except in the presence of acute symptoms. Generally, delayed treatment results in pulp necrosis, followed by periapical radiolucencies and external root resorption. Therefore, an extensive preventive and education program targeting not only parents, but also teachers, is an immediate necessity for Southeastern Anatolia, where the traditional rural lifestyle is still prevalent.

REFERENCES

1. Nik-Hussein NN: Traumatic injuries to anterior teeth among schoolchildren in Malaysia. Dent Traumatol 17:149,2001
2. Soriano EP, Caldas AF Jr, Goes PS: Risk factors related to traumatic dental injuries in Brazilian schoolchildren. Dent Traumatol 20:246, 2004
3. Marcenes W, Al Beiruti N, Tayfour D, Issa S: Epidemiology of traumatic injuries to the permanent incisors of 9–12-year-old school children in Damascus, Syria. Dent Traumatol 15:117, 1999
4. Flores MT, Andreasen JO, Bakland LK, Feiglin B, Gutmann JL, Oikarinen K, Pitt Ford TR, Sigurdsson A, Trope M, Vann WF Jr, Andreasen FM: Guidelines for the evaluation and management of traumatic dental injuries. Dent Traumatol 17:193,2001
5. Çanakci V, Akgul HM, Akgul N, Çanakci CF: Prevalence and handedness correlates of traumatic injuries to the permanent incisors in 13–17-year-old adolescents in Erzurum, Turkey. Dent Traumatol 19:248, 2003
6. Gift HC, Bhat M: Dental visits for orofacial injury: defining the dentist's role. J Am Dent Assoc 124:92, 1993
7. Rajab LD: Traumatic dental injuries in children presenting for treatment at the Department of Pediatric Dentistry, University of Jordan, 1997–2000. Dent Traumatol 19:6, 2003
8. Wong FS, Kolokotsa K: The cost of treating children and adolescents with injuries to their permanent incisors at a dental hospital in the United Kingdom. Dent Traumatol 20:327, 2004
9. Altay N, Gungor HC: A retrospective study of dento-alveola r injuries of children in Ankara, Turkey. Dent Traumatol 17:201, 2001
10. Şaroglu I, Sonmez H: The prevalence of traumatic injuries treated in the pedodontic clinic of Ankara University, Turkey, during 18 months. Dent Traumatol 8:299, 2002
11. Kargul B, Cağlar E, Tanboğa I: Dental trauma in Turkish children, Istanbul. Dent Traumatol 19:72, 2003
12. Zuhal K, Semra OE, Hüseyin K: Traumatic injuries of the permanent incisors in children in southern Turkey: a retrospective study. Dent Traumatol 21:20, 2005
13. Oıkarinen K, Gundlach KKH, Pfeifer G: Late complications of luxation injuries to teeth. Dent Traumatol 3:296, 1987
14. Andreasen JO, Andreasen FM: Classification, etiology and epidemiology. Textbook and Color Atlas of Traumatic Injuries to the Teeth. Copenhagen: Munksgaard; 1994. p. 151.
15. Nicolau B, Marcenes W, Sheiham A: The relationship between traumatic dental injuries and adolescents' development along the life course. Community Dent Oral Epidemiol 31:306, 2003
16. Chan AWK, Wong TKS, Cheung GSP: Lay knowledge of physical education teachers about the emergency management of dental trauma in Hong Kong. Dent Traumatol 17:77,2001
17. Caldas AF Jr, Burgos MEA: A retrospective study of traumatic dental injuries in a Brazilian dental trauma clinic. Dent Traumatol 17:250,2001
18. Castro JCM, Poi WR, Manfrin TM, Zina LG.: Analysis of the crown fractures and crown-root fractures due to dental trauma assisted by the Integrated Clinic from 1992 to 2002. Dent Traumatol 21:12, 2005