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Emergency dental injuries presented at the Beijing Stomatological Hospital in China

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Abstract – *Background/Aim:* There is a lack of epidemiologic studies of traumatic dental injuries (TDI) in China. The aim of this paper was to study TDI of patients visiting the Stomatological Hospital in Beijing China over a 12-month period. *Material and Methods:* The study includes 644 patients, age 1–78, who were admitted to the Beijing Stomatological Hospital between July 2008 and June 2009 for TDI. Dental records and radiographs were reviewed. Age, gender, date, type of TDI, etiology, and tooth and number of teeth injured were recorded. *Results:* Men represented 60.3% of all patients. The highest frequency of dental trauma was found in schoolchildren 7–12 years of age (22.8%), followed by adolescents 13–18 years of age (15.2%) and young adults 19–24 years of age (15.2%). Hospital visits occurred most frequently from the afternoon to late evening in 74.7% of all patients. Most cases occurred on weekends (50.8%). The most common causes of dental trauma were falls (39.6%) and violence (16.9%). Dental trauma caused by motor vehicle was seen in 6.1%. Maxillary central incisors were the most commonly affected teeth (59%). The main types of injury to permanent teeth were uncomplicated crown fractures (20.8%) and subluxations (20.4%) The least common tooth injuries were intrusions (1.4%). Among primary teeth, subluxations (32.1%) were the most common and uncomplicated crown fractures and crown-root fractures comprised 2.5% each. *Conclusion:* TDI in Beijing, China not only shows epidemiologic characteristics in common with many other studies in the world, but also shows different characteristics that should be further studied and taken into consideration when planning for preventive programs and emergency resources.

Citizens of the southern areas of Beijing who require emergency dental services generally seek treatment at the Beijing Stomatological Hospital (BSH). TDI comprise an important proportion of visits. A prior study at BSH was conducted on 22 953 patients who sought emergency dental treatment outside of the clinics office hours during a 12-month period. In that study about half of the emergency visits involved acute pulpitis (39.7%) and acute apical periodontitis (12.3%), while a substantial proportion involved TDI (15.7%) (1).

Similarly, the Stomatological Hospital at Shanghai Second Medical University conducted a large statistical analysis on 10 000 dental emergencies that occurred at night from November 2002 to February 2005. Their study found that a somewhat higher proportion (23.7%) of cases involved TDI (2).

A Swedish survey of their population concluded that although the oral region comprises an area as small as 1% of total body area, oral injuries comprise as much as 5% of all bodily injuries in their data base. A much higher proportion (17%) of oral injuries occurred among preschoolchildren (3). The same study (3) and another study showed that more than 90% of patients with oral injuries sustain injuries to their teeth (4). TDI can compromise dental health and care and lead to esthetic, psychologic, social, and therapeutic problems as well (5).

Traumatic dental injuries frequencies in schoolchildren and adolescents have been widely reported around the world, and TDI distributions have been shown to vary in different populations and age groupings (5–7). In China, however, there is little epidemiologic information regarding TDI. The purpose of this study was to investigate patients with TDI who visited the Stomatological Hospital in Beijing during 1 year.

Materials and methods

Our study is based on the records of 644 emergency patients, aged 1–78 years, who were admitted to BSH during the 12-month period from July 2008–June 2009 for a dental injury.

The dental records and radiographs of each patient were reviewed. The age, gender, date, type of TDI, etiology, and number and type of injured teeth were recorded. Classifications of traumatic dental injury were assigned according to Andreasen's modified WHO and recently used by the International Association for Dental Traumatology (IADT) guidelines of 2007 (5, 6, 8–11). Statistic analyses were made using Excel 7.0 (Microsoft software, Redmond, WA, USA) and the SPSS 17 (SPSS statistical package, Chicago, IL, USA). Descriptive methods were used to analyze and present data.

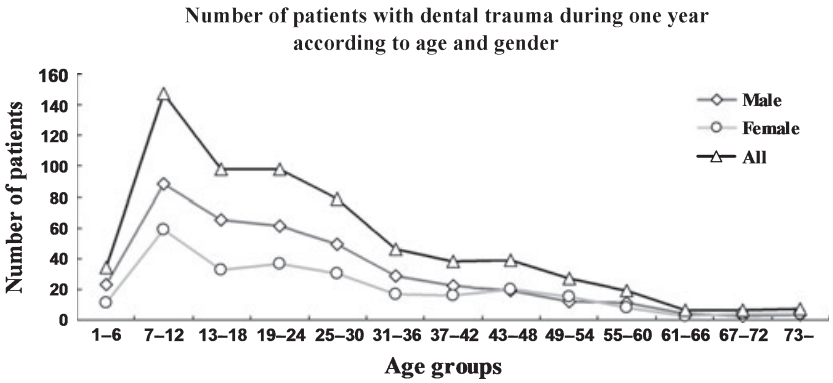

Fig. 1. Number of patients with traumatic dental injuries during 1 year related to age and gender.

Results

Age and gender

Of the 644 TDI patients examined, 388 (60.3%) were men. The mean ages of men and women were 26.5 and 23.5, respectively. About 90% of all patients were <48 years old. The highest age frequency of TDI was found in schoolchildren, where 22.8% of all patients were aged 7–12 followed by adolescents aged 13–18 and young adults aged 19–24. Younger children (5.2%) and older people (3%) showed lower rates of TDI (Fig. 1).

Time of trauma event

During the period of the study, the 4-month period from September to December had the highest rate of TDI visits at 51.2% of the total. The period with the next highest visit rate was March–August, and the lowest visit rate was January and February (Fig. 2a). As far as which days TDI occurred, weekends accounted for 50.8% of all visits, with fewer visits during the weekdays (Fig. 2b). And, as to time of day for TDI, 74.7% occurred during the afternoon, evening, and later (Fig. 2c).

Etiology

The most common cause of TDI visits was 39.6% owing to accidental falls. Less frequent causes were 16.9% from violent altercations, 15.4% from sports accidents, and 14.8% from bicycle accidents. TDI were less frequently caused by motor vehicle accidents (6.1%) and motorcycles (1.6%) (Table. 1). The preponderance of men over women was especially obvious in injuries caused by violence.

Type of teeth injured

The teeth most frequently affected were the maxillary central incisors (59.2%) followed by maxillary lateral incisors (17.9%). Mandible central incisors and mandible lateral incisors were injured much less frequently ($P \leq 0.001$).

Type and number of diagnoses in traumatically injured teeth

In total, 1237 permanent teeth were injured, which included 1317 diagnoses. Of all injured 1156 permanent teeth, 93.5% had only one diagnosis, 76 teeth (6.2%) had two diagnoses each, and three teeth (0.3%) required three diagnoses each. Seventy-nine primary teeth were injured with 81 diagnoses. The most common injuries to permanent teeth were uncomplicated crown fractures and subluxations (Table. 2a).

Among the primary teeth, 77 teeth (97.5%) had a single diagnosis and two teeth (2.5%) had two diagnoses. Subluxations were the most common injuries in the primary dentition, while fractures were not as commonly seen (Table. 2b).

Discussion

This study has investigated patients with TDI who visited the Stomatological Hospital in Beijing during 1 year. There are always limitations in a retrospective study as to whether conclusions can be drawn to the real panorama in Beijing. However, given BSH is the only emergency clinic in southern Beijing with 24-h service and typically the central clinic which patients with TDI visit to seek consultation or treatment, we regard our patients reasonably representative for the TDI panorama in Beijing.

The finding that schoolchildren 6–13 years old are prone to TDI has been reported in the literature before (12–14). This may be because of children being active in sports and play and are more likely to incur dental trauma (3, 12, 13). This higher risk group could be better protected using mouth guards for some sport activities.

Our study also found that adolescents aged 13–18 and young adults 19–24 had high rates of TDI. These two age groups together represent 30.4% of all TDI in our study. The number of preschoolchildren is lower than in similar studies (3, 5). Injuries in preschoolchildren often account for much higher rates, and oral injuries in preschoolchildren has been reported to account for 17% of all body injuries (3). A possible explanation for this may be that small children do not seek treatment at the emergency center, but at the emergency services of the pediatric clinic at our hospital. For this reason, we should be careful interpreting the results of this age group.

The high proportion of fall injuries is a finding worth taking note of. Fall injuries are most often seen in preschoolchildren (3, 5). However, given the low number of preschoolchildren in this study, it is surprising that fall injuries are so common also in schoolchildren and

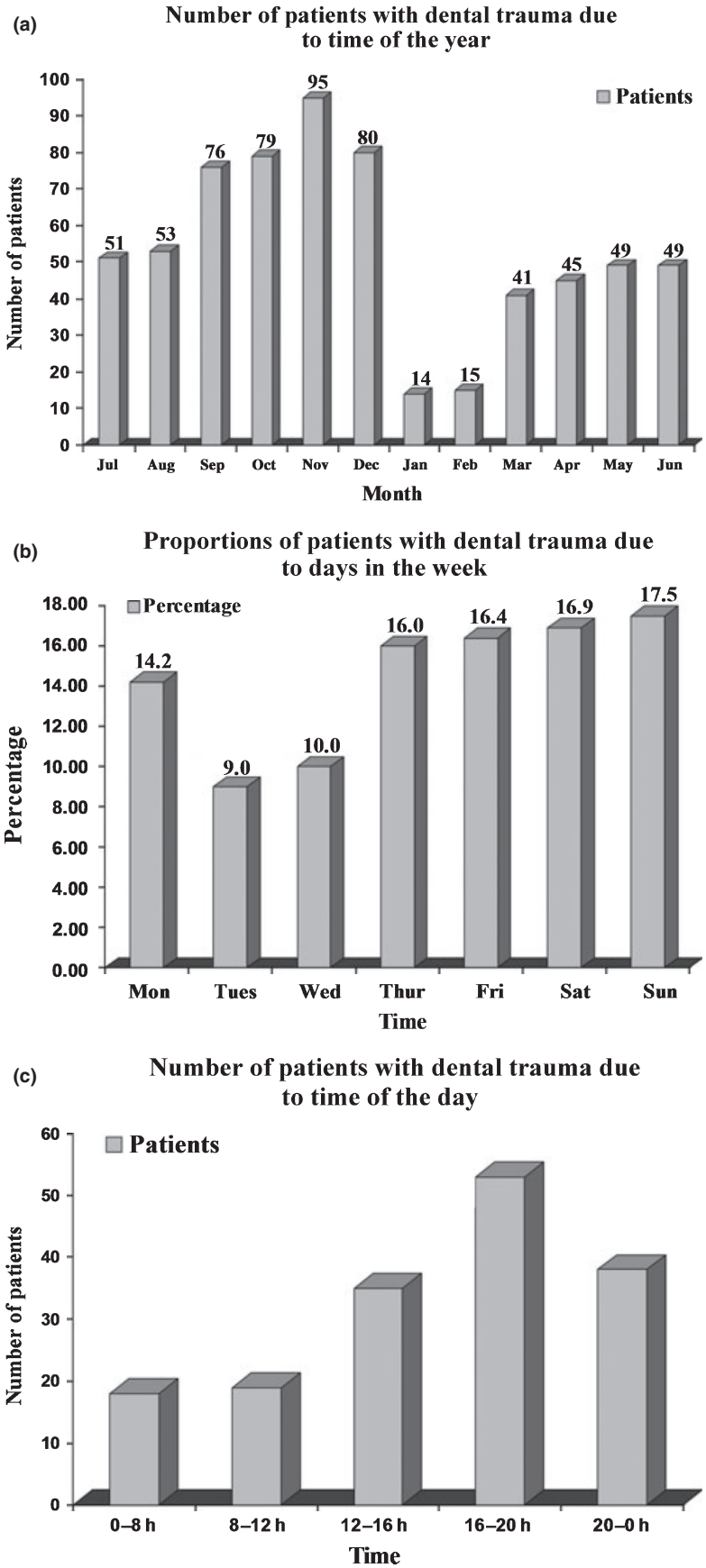

Fig. 2. (a) Number of patients with traumatic dental injuries (TDI) related to time of the year. (b) Proportions of patients with TDI related to days in the week. (c) Number of patients with TDI related to time of the day.

Table 1. Etiology of traumatic dental injuries

	Cause of dental trauma		
	Gender		
	Male n (%)	Female n (%)	All n (%)
Fall	129 (33.2)	126 (49.2)	255 (39.6)
Violence	84 (21.6)	25 (9.8)	109 (16.9)
Sport	74 (19.1)	25 (9.8)	99 (15.4)
Bicycling	52 (13.4)	43 (16.8)	95 (14.8)
Motor vehicle accidents	22 (5.7)	17 (6.6)	39 (6.1)
Motorcycle	5 (1.3)	5 (1.9)	10 (1.6)
Others	22 (5.7)	15 (5.9)	37 (5.7)
All	388 (60.2)	256 (39.8)	644 (100)

Table 2. (a) Type and number of diagnoses of injured permanent teeth. (b) Type and number of diagnoses of injured primary teeth

	Permanent teeth		
Type of injury	Upper n (%)	Lower n (%)	Total n (%)
(a) Type and number of diagnoses in traumatically injured permanent teeth			
Concussion	106 (9.3)	16 (8.9)	122 (9.3)
Subluxation	215 (18.9)	54 (30.2)	269 (20.4)
Extrusion	88 (7.7)	12 (6.7)	100 (7.6)
Lateral luxation	43 (3.8)	9 (5.0)	52 (3.9)
Intrusion	18 (1.6)	1 (0.6)	19 (1.4)
Avulsion	92 (8.1)	19 (10.6)	111 (8.4)
Uncomplicated crown fracture	246 (21.6)	28 (15.7)	274 (20.8)
Complicated crown fracture	146 (12.8)	16 (8.9)	162 (12.3)
Crown-root fracture	105 (9.2)	2 (1.1)	107 (8.1)
Root fracture	42 (3.7)	2 (1.1)	44 (3.4)
Alveolar fracture	37 (3.3)	20 (11.2)	57 (4.4)
Sum	1138 (100)	179 (100)	1317 (100)
(b) The type and number of dental injuries to primary teeth			
Concussion	13 (18.6)	1 (9.1)	14 (17.3)
Subluxation	24 (34.2)	2 (18.1)	26 (32.1)
Extrusion	10 (14.3)	1 (9.1)	11 (13.6)
Lateral luxation	8 (11.4)	3 (27.3)	11 (13.6)
Intrusion	4 (5.7)	0 (0)	4 (4.9)
Avulsion	4 (5.7)	1 (9.1)	5 (6.1)
Uncomplicated crown fracture	2 (2.9)	0 (0)	2 (2.5)
Complicated crown fracture	0 (0)	0 (0)	0 (0)
Crown-root fracture	2 (2.9)	0 (0)	2 (2.5)
Root fracture	3 (4.3)	0 (0)	3 (3.7)
Alveolar fracture	0 (0)	3 (27.3)	3 (3.7)
Sum	70 (100)	11 (100)	81 (100)

adolescents. This may be interpreted as if violence as cause of injuries is yet not as common as in some western countries (3, 5). Bicycle injuries were common in contrast to motor vehicle accidents. China is a rapidly emerging country in the number of motor vehicles, and bicycles will become proportionally less common in the future, which may change the panorama.

The men: women ratio of 1.5:1.0 from this study is similar to other studies that report a range of 1.3–3.3 times moremen than women with TDI (15, 16). Many factors can influence a higher male incidence rate, including; social, cultural, geographic, and high interest in sports activities (17). The reasons for the high male rate in this study were violence and sports. Men participate in sports and nighttime social activities to a larger extent than women, which probably results in higher rates of TDI.

Afternoons and evenings had the highest rates of TDI visits. This timing also correlates with most people's free time after work/school. Some may choose to participate in sports and other physical activities at this time. Most of the TDI occurred during weekends. Other studies have shown a similar pattern (3, 18). The fact that TDI occurs during times outside dental office hours is important for the planning of 24-h availability and on call services for TDI. BSH is a well-functioning emergency clinic with 24 h/7 days availability. The finding that there were so few injuries in January and February is probably due to the fact that these 2 months were very cool and many individuals stayed indoor during these months, which may have limited their outdoor activities and sports.

The types of injuries and their distribution seem to be in accordance with most international studies showing more luxation injuries than crown fractures among primary teeth than permanent teeth (19, 20). Comparing the surrounding bone in primary dentition with permanent dentition, the former is less dense and mineralized, suggesting that a primary tooth hit by traumatic impact can be more easily displaced than fractured (21, 22).

Crown fractures were usually managed with restorative procedures, sometimes in combination with endodontics. Similar results have been reported in other studies (19). These required complicated treatments, including repositioning, stabilization, restorations, and more complex alveolar reductions. Follow-up included appointments, evaluations, and comprehensive care all of which are expensive (20).

The maxillary incisor was injured more frequently than any other tooth, which is consistent with most other studies of this type (23). The reason is the location of these teeth, making them more vulnerable to all types of accidental injury. In many situations, a mouth guard used in contact sports, such as basketball, football, hockey, and in some non-contact sports as well.

Conclusion

Traumatic dental injuries in China have epidemiologic characteristics in common with many other studies in the world, but also certain characteristics that should be taken into consideration when planning for preventive programs and emergency resources. Within the limitations of this first study in Beijing, we concluded that precautions should be encouraged in China to reduce TDI, especially among schoolchildren and sports enthusiasts. We also recommend that adolescents and young adults take special precautions during their free time when participating in social events and/or sports.

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