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Dento-alveolar and maxillofacial injuries among different ethnic groups in Israel

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Abstract – An evaluation of dental and maxillofacial trauma in a level 1 trauma center in Israel was carried out to assess the causes of trauma and the relationship between the injuries to the patient's age, gender and ethnicity. Analysis was based on data from the Israel Trauma Registry. Patients hospitalized in a level 1 trauma center from January 1, 2000 to December 31, 2005 were analyzed according to age, gender, time, place, ethnicity and cause of injury. Files of 22 558 trauma patients were reviewed. Maxillofacial and tooth injuries were separated and further analyzed according to the above parameters. Maxillofacial or dental injuries were observed in 1668 (7.4%) of the trauma patients, caused by motor vehicle accidents (39.2%), falls (30.9%), and intentional injuries (21.2%). Most occurred on the street/road (46.5%), at home (18.8%), and in public buildings (12.4%). Arab patients suffered more from vehicle accidents while Jewish patients presented more intentional injuries. Men were hospitalized three times more than women, and young people were at greater risk. The most frequent age of trauma was 19–28 years (27.6%). Ethnic differences were particularly noticeable for intentional injuries and vehicle accidents. This emphasizes that a larger percentage of the Arab population suffered from dental and maxillofacial injuries. Further dental health education and training for primary caregivers are warranted.

Maxillofacial injuries are a significant cause of morbidity and demand a meticulous treatment plan (1–4). Etiology, type and site of these injuries differ depending on various factors. Geographic area and socioeconomic status of populations may affect the results of studies. The incidence and causes of maxillofacial injuries have been widely studied (5–12). Worldwide, traffic accidents, assaults, falls, sports-related injuries, and civilian warfare are the main causes (9). The large variability in reported prevalence (12) is due to the patient's environment, gender, age, socioeconomic status, as well as the mechanism of injury (10, 11). Understanding the demographic patterns of maxillofacial injuries is important for prevention and treatment. Men, alcohol consumption, and interpersonal violence are among the risk factors for maxillofacial fractures (5, 13, 14).

National statistics regarding facial trauma reflect living standards, culture, implementation, and enforcement of laws. For example, the introduction of seat belt laws has contributed to a reduction in serious and fatal injuries, as well as changes in the types of injuries (15–18).

Over the past several years, oral maxillofacial injuries have increased. For example, patients presented with facial fractures at a Maxillofacial and Oral Surgery Unit in New Zealand almost doubled from 1989 to 2000 (13). The number of maxillofacial fractures increased 27.9% over a 16-year period in Finland, and 20% in the United Kingdom (19, 20). An Israeli study was conducted to reveal the incidence and outcome of intentional injuries requiring emergency room care among children and adolescents. In a national sample, ethnic differences were found among patients, especially for attempted and completed suicide. There was a clear male dominance among children and adolescents admitted to the emergency room. It was concluded that this may be a result of differential disclosure of information due to social and cultural norms or differential recording by health professionals (21).

As different ethnic groups might need diverse educational and interventional programs for injury prevention, the study of the major causes of dental and maxillofacial injuries among different ethic groups is of great importance.

The aim of the present study was to evaluate the occurrence of dento-alveolar and maxillofacial injuries over 5 years in a level 1 trauma center in Israel with regard to age, gender, ethnicity, etiology of the injury, time, and place of injury.

Patients and methods

This is a retrospective cohort study of patients recorded in the Israel National Trauma Registry (ITR) from January 1, 2000 to December 31, 2005. The ITR records all casualty admissions to hospitals, in-hospital deaths, and transfers to another trauma center in Israel. Data in this study refer only to one level 1 trauma center where patients were hospitalized with a diagnostic injury code and an abbreviated injury scale between 243400.1-251800.2 and 243099.1. Data collected were analyzed according to age, gender, ethnicity, etiology of the injury, time, and place of injury. A total of 22 558 trauma files were reviewed. Maxillofacial and tooth injuries were separated and further analyzed according to the above parameters. The descriptive analysis was processed using SAS 9.1.3 Service Pack 3. $P < 0.05$ (chi-squared test) was considered significant.

Results

Maxillofacial or tooth injuries were found in 1668 (7.4%) of the 22,558 patients, mostly Jewish ($n = 938$, 56.2%), followed by Arabs ($n = 701$, 42%), and tourists or foreign citizens ($n = 29$, 1.7%). Table 1 shows the main causes of these injuries according to ethnicity. Motor vehicle accidents (39.2%) were the most common cause, followed by falls (30.9%), and intentional injuries (21.2%). Arabs suffered more from vehicle accidents and Jews presented more intentional injuries. Table 2 shows that most injuries occurred on the street/road (46.5%), at home (18.8%), and in public buildings (12.4%).

Table 3 shows the distribution of maxillofacial injuries by age and gender, with a male-to-female ratio of 3:1. Maxillofacial injuries were most prevalent among 19–28 year olds (27.6%). Multi-organ injuries involving the maxillofacial area were frequent (Table 4).

Discussion

Dental trauma is a significant clinical problem in children and adolescents. Area-based measures of deprivation, such as an overcrowded household and ethnicity were found to be predictors of traumatic dental injuries (22).

The present study showed that ethnic differences were particularly noticeable for intentional injuries and vehicle accidents. It is noteworthy that in the area surrounding the studied trauma center, the total population is approximately 10% Arab and 90% Jewish (23). This emphasizes that a larger percentage of the Arab population suffered from dental and maxillofacial injuries.

Intentional injuries accounted for the difference in trauma rates among the Jewish and Arab children and adolescents. This may be explained by methodological issues concerning the identification and recording of cases or by sociological differences in care-seeking behavior (21). Ethnic differences are a significant factor among patients in other countries. In the United States, Caucasian teenagers have a higher rate of suicide than African-American teenagers (24). In Canada, the sub-19-year-olds in aboriginal reserve communities have a higher suicide rate than the total population (25). Accurate data are essential in these cases to determine the different trends between population groups.

In this study, maxillofacial or tooth-related injuries were observed in 7.4% of all patients hospitalized with trauma injuries, which represent a relatively large proportion of trauma cases. Primary care providers (e.g.,

Table 2. Place of trauma occurrence

Place of event	*n* (%)
Street/road	775 (46.5)
Home	314 (18.8)
Public building	207 (12.4)
Industrial area	55 (3.3)
Sports area	40 (2.4)
Other	277 (16.7)
Total	1668 (100)

Table 3. Trauma distribution according to age and gender

Age*/gender	*n* (%)
0–9	231 (13.8)
10–18	272 (16.3)
19–28	460 (27.6)
29–38	251 (15.0)
39–48	162 (9.7)
49–58	91 (5.5)
>59	196 (11.8)
Males	1280 (76.7)
Females	388 (23.3)
Total	1668 (100)

*There are five missing reports in the age distribution.

Table 1. Causes of trauma according to ethnicity*

Cause of trauma	Jews	Arabs	Tourists and foreign citizens	Total	*P*-value (chi-squared test)
Motor vehicle accidents	357 (38.1)	288 (41.1)	9 (31.0)	654 (39.2)	0.215
Falls	294 (31.3)	217 (31.0)	5 (17.2)	516 (30.9)	0.8669
Burns	1 (0.1)	0 (0)	0 (0)	1 (0.1)	NA
Other unintentional injuries	67 (7.1)	69 (9.8)	7 (24.1)	143 (8.6)	0.0499
Intentional injuries	219 (23.4)	127 (18.1)	8 (27.6)	354 (21.2)	0.0103
Total	938 (100)	701 (100)	29 (100)	1668 (100)	

Values within parenthesis are expressed in percentage. NA, not applicable.
*It is noteworthy that in the area surrounding the studied trauma center, the total population is approximately 10% Arab and 90% Jewish (23).

Table 4. Maxillofacial trauma according to age and involved organ

	Age						
	0–9	10–18	19–28	29–38	39–48	49–58	59+
Nose	39 (16.9)	39 (14.3)	46 (10)	32 (12.7)	16 (9.9)	11 (12.1)	56 (28.6)
Orbit	54 (23.4)	26 (9.6)	33 (7.2)	18 (7.2)	10 (6.2)	8 (8.8)	18 (9.2)
Mandible	34 (14.7)	62 (22.8)	126 (27.4)	62 (24.7)	41 (25.3)	9 (9.9)	12 (6.1)
Zygoma	5 (2.2)	13 (4.8)	32 (7)	20 (8)	14 (8.6)	10 (11)	30 (15.3)
Maxilla	12 (5.2)	11 (4)	51 (11.1)	30 (12)	25 (15.4)	16 (17.6)	35 (17.9)
Teeth	28 (12.1)	34 (12.5)	18 (3.9)	6 (2.4)	8 (4.9)	1 (1.1)	1 (0.5)
Alveolar ridge	–	–	2 (0.4)	–	–	–	–
Facial bone(s)	2 (0.9)	7 (2.6)	10 (2.2)	4 (1.6)	2 (1.2)	1 (1.1)	6 (3.1)
Mouth	5 (2.2)	1 (0.4)	–	1 (0.4)	1 (0.6)	–	–
Tongue	17 (7.4)	2 (0.7)	5 (1.1)	2 (0.8)	3 (1.9)	1 (1.1)	1 (0.5)
Multiple injuries	35 (15.2)	77 (28.3)	137 (29.8)	76 (30.3)	42 (25.9)	34 (37.4)	37 (8.9)
Total	231 (100)	272 (100)	460 (100)	251 (100)	162 (100)	91 (100)	196 (100)

Values are given as *n* (%).

family physicians, pediatricians, nurses, physician assistants, etc.) could play a more prominent role in providing care after dental trauma. Special emphasis should also be given to provide first response caregivers (emergency medical technicians, EMT) with the relevant education to improve their knowledge and ability to handle the diagnosis and treatment of dental trauma (26).

The most frequent age of trauma was in persons aged 19–28 years, which is in accordance with others (5–8, 13, 14). This may be due to the increase in motor vehicle accidents among young adults soon after receiving their license. In the present study, motor accidents were the most common cause of dental trauma, replacing dental injuries inflicted in children, aged 6–9.

The rise in the use of cars and the increase in the rate of vehicle accidents are considered the main causes of morbidity and mortality today. Thus, there is a need for new evaluations, with an emphasis in treating dental trauma, as well as a need to increase awareness of all medical staff treating trauma victims in the hospital emergency room, including EMT. Furthermore, it is important to educate these young people regarding the consequences of vehicle accidents.

A limitation of this study was that only one large trauma center was used to collect data. Further research, preferably using multi-centered data, is warranted. However, the data provided here should be addressed when planning educational programs regarding the major causes of dental and maxillofacial injuries among different ethic groups. A general educational and interventional program should be designed to diminish the frequency of those injuries.

Conclusions

The present study showed that ethnic differences were particularly noticeable for intentional injuries and vehicle accidents. This emphasizes that a larger percentage of the Arab population suffered from dental and maxillofacial injuries. Further dental health education and training for primary caregivers are warranted.

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