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DENTAL TRAUMATOLOGY

Incidence of dental trauma associated with facial trauma in Brazil: a 1-year evaluation

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Abstract – Dental trauma occurs frequently in young people, and mostly occurs in conjunction with facial trauma. In the literature, there are still few reports relating dental trauma, facial trauma, and soft-tissue injuries. This research aimed to evaluate: (i) the overall incidence of dental trauma in 340 patients who presented with facial trauma over a 1-year-period, (ii) the epidemiology of these related diseases, and (iii) the most common dental trauma when a facial trauma was present. Of all facial trauma, 15.29% presented dental trauma, of which luxations and avulsions were the most frequent injuries (40.30% each), occurring mainly on weekends (38.46%) and in October (15.38%), followed by March and June (13.46% each). The sex ratio presented the proportion of 3.3:1 (M:F). Trauma occurred mainly in the second decade (44.23%). These results highlight the high incidence of dental and facial trauma, and suggest the importance of the adoption of appropriate prevention protocols and effective therapeutic methods.

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Trauma to the teeth and their related structures may be the most common facial trauma. These types of trauma may be a result of many factors such as falls, traffic accidents, assaults, sports accidents, work accidents, etc., with falls being the most frequent cause (1–3).

When facial trauma occurs, the inclusion of dental trauma depends mainly on the impact energy and direction of the causal agent and the resistance of the tissues protecting the involved teeth. The anterior teeth are particularly susceptible, and their projection and labial competence are important factors in assessing their susceptibility.

A high prevalence of these traumatic injuries in childhood and adolescence has been described in the literature (4, 5). This prevalence ranges from 4 to 33%, according to the sex and age of patients (1, 6–8). Facial and bone fractures and soft-tissue injuries are different from dental injuries as they occur at any age.

The purpose of this study was to assess the incidence and characteristics of dental trauma that occur in conjunction with facial trauma. The study took place over a 1-year period in the Oral and Maxillofacial Surgery Department of Piracicaba Dental School, Campinas State University (Unicamp), São Paulo (SP), Brazil.

Materials and methods

From April 1999 to March 2000, 340 patients with facial trauma were documented in the Department of Oral and Maxillofacial Surgery at Campinas State University (Unicamp), Piracicaba Dental School, Brazil. The relationship between patients with facial trauma and those that presented with dental trauma or soft-tissue injuries (loss of epithelium integrity) was analyzed. Patients were evaluated at the hospitals Santa Casa of Limeira, Santa Casa of Rio Claro, and Fornecedores de Cana of Piracicaba, and at Piracicaba Dental School (Unicamp). Each patient was evaluated and treated by a total of five students and professors, who were also responsible for the patient's follow-up.

Clinical records were kept for each patient, which enabled data storage and observation of the patient's

clinical development for the research. The records of all the patients were reviewed, and the frequency of dental trauma in conjunction with facial injuries, age, gender, monthly and weekly distribution, cause and type of injury, and concomitant facial injuries and associated body traumas were documented, analyzed and presented in tables.

The type of dental trauma seen was classified, according to the system described by Andreasen & Andreasen (1997; 2). The dentoalveolar fractures associated with dental trauma were analyzed and classified separately.

Results

In the 1-year period of this study, 340 patients with facial trauma were analyzed. Of these patients, 15.29% presented with associated dental trauma, of which luxation injuries (40.30%) and avulsions (40.30%) were the most frequent, followed by crown fractures (8.95%), concussion (4.48%), intrusion (4.48%), and subluxation (1.49%), as shown in Table 1.

When the etiology of the facial trauma was analyzed, 37.06% were caused by falls, 26.47% by traffic accidents, 19.41% by assaults, 8.24% by work-related accidents, 6.47% by sports injuries, and 2.35% by others. The dental trauma occurred mostly as a result of falls (51.92%), followed by traffic accidents (25%), assaults and work accidents (9.62% each one), and sports (3.84%). The weekly distribution showed that most dental trauma occurred on weekends (38.46%), mainly on Sundays (32.69%). The facial trauma data showed that weekends (44.41%) were the most common time of injury, especially Saturdays

Table 1. Patients and trauma characteristics

	Number of patients	Dental trauma in % (52)	Number of patients	Facial trauma in % (340)
Age (years)				
0–10	15	28.85	43	12.65
11–20	23	44.23	85	25.00
21–30	5	9.61	88	25.88
31–40	7	13.46	69	20.29
41–50	2	3.85	26	7.65
51–61	0	0	12	3.50
61–70	0	0	7	2.03
71–80	0	0	8	2.40
Over than 80	0	0	2	0.60
Total patients	52	100	340	100
Sex				
Man	40	76.92	267	78.53
Woman	12	23.08	73	21.47
Total patients with dental trauma	52	100	340	100
Sex ratio (man:woman)	3.3:1	–	3.7:1	–
Weekly distribution				
Sunday	17	32.69	74	21.76
Monday	1	1.92	43	12.65
Tuesday	9	17.31	39	11.47
Wednesday	6	11.54	35	10.29
Thursday	5	9.62	25	7.36
Friday	11	21.15	47	13.82
Saturday	3	5.77	77	22.65
Total patients	52	100	340	100
Monthly distribution				
January	5	9.62	30	8.82
February	1	1.92	29	8.53
March	7	13.46	34	10.00
April	4	7.68	25	7.35
May	2	3.85	15	4.42
June	7	13.46	33	9.71
July	3	5.77	29	8.53
August	5	9.62	30	8.82
September	3	5.77	20	5.88
October	8	15.38	44	12.94
November	2	3.85	27	7.94
December	5	9.62	24	7.06
Total patients	52	100	340	100

Table 2. Patients' oral conditions at initial visit

	Number of patients	Dental trauma in % (52)	Number of patients	Facial trauma in % (340)
Oral hygiene				
Satisfactory	24	46.15	111	32.64
Regular	20	38.46	174	51.18
Unsatisfactory	8	15.39	55	16.18
Total patients	52	100	340	100
Dental condition				
Dentate	35	67.31	181	53.24
Partially dentate	17	32.69	129	37.94
Toothless	0	0	30	8.82
Total patients	52	100	340	100
Type of dentition				
Permanent	36	69.23	268	78.82
Permanent/primary	10	19.23	28	8.24
Absentee	0	0	25	7.35
Primary	6	11.54	19	5.59
Total patients	52	100	340	100

Table 3. Place of presentation

Place of attendance	Number of attendance	Dental trauma in % (52)	Number of attendance	Facial trauma in % (340)
Santa Casa, Limeira Hospital	28	53.85	144	42.35
Santa Casa, Rio Claro Hospital	15	28.85	133	39.12
Forncederores de Cana, Piracicaba Hospital	5	9.62	46	13.53
Piracicaba Dental School	4	7.69	17	5
Total attendance	52	100	340	100

Table 4. Etiology of dental trauma related to facial trauma

Etiology	Number of patients	Dental trauma in % (52)	Number of patients	Facial trauma in % (340)
Falls	27	51.92	126	37.06
Traffic accidents	13	25.00	90	26.47
Assaults	5	9.62	66	19.41
Work accidents	5	9.62	28	8.24
Sports accidents	2	3.84	22	6.47
Others	0	0	8	2.35
Total patients	52	100	340	100

(22.65%). Both the facial and dental trauma data showed a monthly distribution, with peaks both in October and March, as shown in Table 1. It was also observed that trauma occurred more in males than in females, in proportions of 3.3:1 for dental traumas and 3.7:1 for facial traumas. The overall age distribution showed the peak incidence for the second decade of life (44.23%), followed by the first decade (28.85%), and a sharp decrease in incidence after the second decade. More than 82% of all dental trauma occurred before 30 years of age, with a mean age of these patients being 18.02 years. The same analysis in facial trauma showed that the mean age was 27.59 years and the peak of incidence was in the third decade of life (25.88%). Regarding oral conditions, most patients presented with satisfactory hygiene and were mainly dentate, and most of their teeth were permanent in facial trauma as well as in dental trauma, as shown in Table 2.

Thirty percent of traffic accidents were because of the reason that related patients were not using a seat belt or safety helmet. Likewise, in bicycle accidents (Table 5), 100% of patients were not wearing protective devices.

The analysis of associated facial injuries related to dental trauma showed that most of the patients (51.92%) sustained dental trauma and soft-tissue

Table 5. Safety-device use according to the trauma etiology

Etiology	Number of patients	Safety-device use	%
Falls (bicycles accidents)	14	0	0
Traffic accidents	13	9	69.23
Work accidents	5	0	0
Sports	2	0	0

Table 6. Type of dental trauma

Type of dental trauma	Number of traumas	Dental trauma in % (52)
Concussion	3	4.48
Subluxation	1	1.49
Luxation	27	40.30
Intrusion	3	4.48
Avulsion	27	40.30
Crown fracture	6	8.95
Total dental traumas	67	100
Patients with dental trauma	52	–
Patients with no dental trauma	288	–

injury together, followed by only dental trauma (34.62%) as shown in Fig. 1. Of all soft-tissue-injury cases, most needed suturing (62.07%), as shown in Table 7. 13.46% of all cases involved bone fractures, occurring most frequently as in maxillary dento-alveolar fractures (71.43%), as shown in Fig. 1 and Table 8.

Discussion

The present study evaluated all individuals presenting with soft-tissue injury or dental trauma in patients who had sustained facial trauma.

Generally, the literature indicates that childhood is the most susceptible period for the occurrence of trauma (1, 4, 9, 10). However, the present study demonstrated a greater incidence of trauma in patients ranging from 11 to 20 years. This represents a trend of trauma occurrence in school-age patients, possibly as a result of intense social activity of these individuals. Most trauma cases occurred in males and were caused by falls, which is in agreement with other studies (9, 11–14). The high incidence of this etiology is partially because of inclusion of bicycle accidents in this group (15, 16). Of all falls, 51% were caused by bicycle accidents, in which patients were not wearing protective devices. Likewise, the investigation of traffic accidents revealed that approximately 30% of patients were not using seat belt or safety helmet, in spite of it being the law in this area. These data confirm the need for more safety devices, mainly for bicycle riders.

Although some studies indicate school vacations and summer as the periods of highest incidence (11, 17, 18), the present study did not find any such correlation, demonstrating higher incidence of dental and facial trauma in October and March only. In agreement with other studies (13, 17, 18), we also observed higher trauma incidence on weekends.

Regarding the type of trauma, there was a greater number of luxation injuries and dental avulsions and only a few crown fractures, which is different from most studies (1, 2). The few crown fractures and high number of luxation injuries were probably the result of the severity of these traumas involving young individuals, who are more susceptible to high-energy impacts.

Despite the high prevalence and close relation between facial trauma and soft-tissue injuries, only a few studies have specifically analyzed this relationship (19). It is a difficult relationship to study as many patients with soft-tissue injuries are seen in emergency

Table 7. Associated trauma and soft-tissue injuries in dental and facial trauma

	Number of traumas	Dental trauma in % (52)	Number of traumas	Facial trauma in % (340)
Associated body traumas				
Trunk	22	42.31	156	44.88
Head and neck	5	9.61	58	17.06
Thorax	5	9.61	38	11.18
Abdomen	0	0	11	3.23
Total traumas	32	–	263	–
Patients with associated traumas	24	46.15	166	48.82
Patients with no associated traumas	28	53.85	174	51.18
Total patients	52	100	340	100
Concomitant facial injuries				
Soft tissue injuries	29	55.77	129	37.94
No soft tissue injuries	23	44.23	211	62.06
Total patients	52	100	340	100
Treatment of facial soft-tissue injuries				
Suture	18	62.07	88	68.22
No suture	11	37.93	41	31.78
Total injuries	29	100	129	100

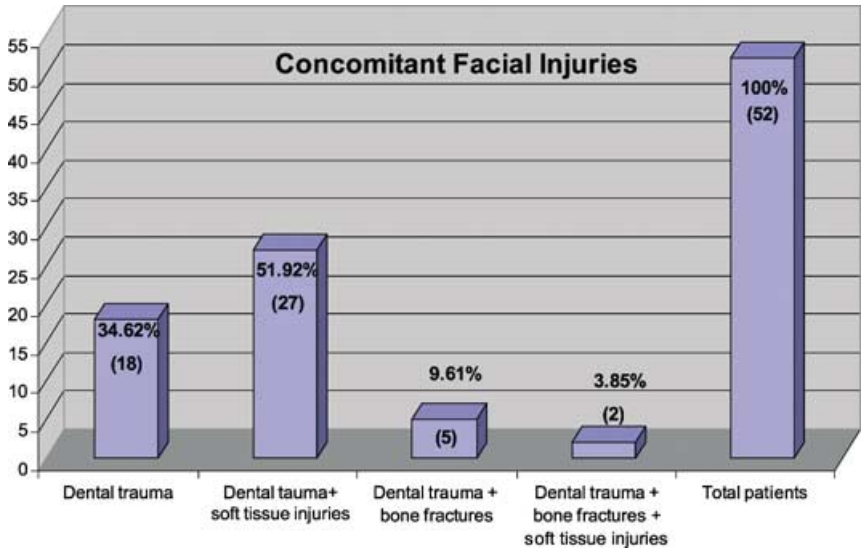

Fig. 1. Concomitant facial injuries in dental-trauma patients.

Table 8. Distribution of facial fractures

Dentoalveolar fractures	Number of patients	Dental trauma in % (52)	Number of patients	Facial trauma in % (340)
Maxillary fractures	5	71.43	7	41.18
Mandibular fractures	2	28.57	10	58.82
Total maxillomandibular fractures	7	100	17	100

rooms of hospitals where dental injuries are easily overlooked. Thus, soft-tissue injury may be treated by another professional and dental evaluation might never be done. This problem is emphasized by Omovie & Shepherd (1997; 20) in UK, who found that 55% of facial lacerations had been sutured at the emergency care and only 21% of these lesions were treated by maxillofacial surgeons.

In spite of this difficulty, we demonstrated a high incidence of facial trauma in conjunction with dental trauma, which highlights the need for additional investigations along this line, as facial esthetics is very important in our societies.

Another relationship was found between dental traumas and dentoalveolar fractures, showing that most were related with maxillary fractures (71.43%), mainly in the anterior region.

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