A PROSPECTIVE STUDY OF DENTOALVEOLAR TRAUMA AT THE HOSPITAL DAS CLÍNICAS, SÃO PAULO UNIVERSITY MEDICAL SCHOOL

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PURPOSE: This prospective study evaluated the profile of patients with dentoalveolar trauma assisted at the emergency room of the Oral and Maxillofacial Trauma and Surgery Service at the Hospital das Clínicas, São Paulo University Medical School (Brazil).

METHODS: A prospective study by a questionnaire applied during the first attendance of those patients, in a period of eight months.

RESULTS: The collected data were statistically analyzed. It was observed that 4.7% of the patients that sought treatment at the Service had sustained dentoalveolar trauma and among these 74% were male. The most affected individuals were children aged 0 to 5 years and fall was the most prevalent etiologic factor. Avulsion and coronal/crown-root fractures were the most common types of dentoalveolar traumatic injuries. As the age increases, the most common etiologic factors are traffic accidents and physical assault.

CONCLUSION: The incidence of dentoalveolar trauma decreased with age and the main etiologic factors in adult patients were traffic accidents and physical assault.


INTRODUCTION

The epidemiologic study of dentoalveolar trauma relies directly on factors such as sampling criteria, age and sex of the surveyed population. Prospective studies significantly reduce the incidence of recording errors from previous traumas, which depend on information from family members or medical files of previous trauma history.

Dentoalveolar traumas have been investigated for several years to gather information about their characteristics, etiology and most commonly affected patients, which is of paramount importance to contribute in preventing their occurrence.

Studies on dentoalveolar traumas are generally performed at schools in large or middle-sized cities, middle-sized hospitals and Dental Schools. The city of São Paulo in Brazil is the second largest in Latin America and is an outstanding national medical reference center.

The purpose of this study was to perform a prospective study of dentoalveolar trauma at the Hospital das Clínicas of the Medical School of the University of São Paulo.

METHODS

A prospective study of dentoalveolar trauma epidemiology was carried out among emergency room patients treated by the internship students of the Oral and Maxillofacial Trauma and Surgery Service at the Hospital das Clínicas, São Paulo University Medical School (Brazil), within an 8 month-period.
Physical and radiographic examinations were performed and the diagnosis and proper treatment approach were established for each case. Thereafter, some data (sex, age, etiologic factor and frequency of the different types of trauma) were collected using a standard questionnaire form (Figure 1).

Statistical analysis was performed by Student’s t, Kruskal-Wallis and Mann-Whitney tests followed by Dunn’s Post Hoc test for multiple comparisons.

RESULTS

Throughout the study duration, 1,650 patients were referred for treatment at the emergency room of the Oral and Maxillofacial Trauma and Surgery Service at Hospital das Clínicas. From this total, 78 (4.7%) patients presented some kind of dentoalveolar trauma.

Among the patients with dentoalveolar trauma, 74% were male and 26% were female (Figure 2), which corresponds to a 3:1 ratio. Patients’ ages ranged from 9 months to 52 years. Most cases occurred within the first 5 years of life (17 patients; 21.8%), followed by the 21-25 year-old age group (13 patients; 16.7%) and the 31-40 year-old age group (11 patients; 14.1%) (Figure 3). Analysis of age relative to sex did not show statistically significant difference between the averages for male (19.1 years) and female patients (15.6 years) (Student’s t-test: p=0.305 and p>0.05, respectively) (Table 1).

Table 1 - Descriptive analysis of age (years) according to sex, compared by Student t-test

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>5-10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>10-15</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>15-20</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>20-25</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>25-30</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>30-35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35-40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40-45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45-50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50-55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>55-60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60-65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total number of patients</td>
<td>57</td>
<td>20</td>
</tr>
</tbody>
</table>

Student t-test:1.033; p=0.305
Among the etiological factors, the most frequent causes of dentoalveolar trauma were falls (40.8%), followed by automobile accidents (37.4%), which involved car, motorcycle and bicycle accidents as well as overruns. Physical assault (punches, kicks and firearm wounds) corresponded to 11.6% of the cases, while collision with objects represented the third highest incidence (4.8%), followed by sports accidents (3.4%) and working site accidents (2%) (Figure 4).

Analysis of age relative to etiological factor revealed that among patients aged 0 to 5 years, fall was the most prevalent cause of dentoalveolar traumas. Traffic accidents and aggressions were the most frequent in the 21-25 and 31-40 year-old age groups. Most patients with dentoalveolar traumatic injuries resulting from engagement in sport activities were in the 10-15 year-old age group. Victims of traffic accidents were 27.7 years old on average while the mean age of victims of physical assault was 23.7 years. However, among the patients that had sustained traumatic dentoalveolar injuries as a consequence of falls, the average age dropped to 8.7 years. Variation of age relative to the etiological factor exhibited statistical significance (Kruskal-Wallis test and Dunn’s multiple comparison test) (Table 2).

Physical assault was the most frequently reported cause of dentoalveolar trauma in men (92.3%). Nevertheless, no significant difference between sexes was observed when fall victims were evaluated (45% were men and 55% were women) (Table 3).

Avulsion and coronal/crown-root fractures were the most common types of dentoalveolar traumatic injuries, corresponding to 20.4% and 19.7% of all cases surveyed, respectively. Alveolar fractures were also relatively common (17%), followed by lateral luxation (13.6%). Concussions and subluxations were the least frequent dentoalveolar traumas, accounting for only 1.4% and 3.4% of the cases, respectively (Figure 5).

Most alveolar fractures occurred in patients involved in traffic accidents and accounted for the most severe dentoalveolar traumas. Severe dentoalveolar injuries such as alveolar fractures and avulsions were also observed in cases of physical aggressions. Fall victims presented most frequently lateral and intrusive luxations, tooth fractures and avulsions, with small differences in the incidence of each type of trauma (Table 4).
DISCUSSION

Different frequencies of dentoalveolar trauma are found in the literature, depending on the employed methodology, i.e., 35%\(^\text{10}\), 24.4%\(^\text{11}\) and 11.1%\(^\text{12}\), which hampers the comparison of incidences. This variation may be influenced by the type of dentition (primary - 30%; permanent - 22%)\(^\text{13}\) and patients’ age (the frequency of dentoalveolar trauma has been shown to vary inversely proportional to age and incidences between 5.2 and 11.7% have been observed in different age groups)\(^\text{14}\). A great part of these studies investigated dental trauma in schoolchildren by means of clinical examinations and questionnaires. Therefore, the incidence becomes cumulative, which might increase significantly the number of cases. On the other hand, the number of dentoalveolar traumas decreases significantly when epidemiologic studies are performed in a hospital environment. This has been reported by Galea\(^\text{15}\), who found an incidence of 1.8%, close to the one observed in present the study (4.7%).

The increase of accidents involving women results from the greater female engagement in activities formerly restricted to men. At the time of writing, women participate in every sports activity, including radical sports and automobile races. Even so, dentoalveolar traumatic injuries are still more prevalent among male individuals at a ratio of 2:1 or 3:1\(^\text{1.16}\), as found in the present study (74.3%). Petti and Tarsitani\(^\text{17}\) reported a greater prevalence of dental trauma cases for females, but the patients in their study were 10 years old.

There is a lesser incidence of dentoalveolar trauma as age increases\(^\text{8,18}\). This was also observed in the present as most cases of trauma occurred in patients aged 0 to 5 years (21.8%) and falling was the most frequent cause. These findings are probably explained by the fact that this is a phase of motor skill development and therefore children of this age group are more susceptible to falls and might hit the face against the floor or obstacles. The second highest frequency of dentoalveolar trauma was observed among young adults aged 21 to 25 years (16.7% of all cases). For this group and for the 31-40 year-old age group (14.1% of all cases), the most common causes of dentoalveolar traumatic injuries were traffic accidents and aggressions. It has been shown that when the survey includes former dental trauma history\(^\text{10,11,14,19}\), data become cumulative, which means that the older the patient, the greater the probability of trauma occurrence in his/her life, reversing the proportional ratio.

The findings of this survey revealed that fall was the most frequent etiologic factor, corresponding to almost forty-one percent of all cases of dentoalveolar trauma, which agrees with the outcomes of previous studies\(^\text{8,15,20-23}\). Few cases of dentoalveolar traumatic injuries were attributed to sports accidents (3.4%), which is consistent with the results of other authors\(^\text{20,24}\).

Avulsions (20.4%) and coronal/crown-root fractures (19.7%) were the most frequent types of dentoalveolar injury. The different classification criteria found in the literature makes it difficult to compare the outcomes of different studies. Even so, crown fractures, either complex or not, involving enamel or enamel/dentin, are the most commonly reported types of dentoalveolar traumatic injury\(^\text{10,12,15,24-27}\). However, da Silva et al.\(^\text{6}\) found avulsion and luxation as the most prevalent dentoalveolar traumas.

Most patients assisted at the emergency room within the surveyed period presented moderate to severe injuries, while simple traumas were considerably less frequent. It probably occurred because this is a tertiary care university hospital that offers specialized assistance in several areas and to which complicated cases are referred to from other cities, states and even dental offices that are not able to provide the required treatment. These findings corroborate those of Andreasen\(^\text{28}\), who reported that severe traumas such as luxation and bone fracture were more frequent among hospital patients, whereas crown fractures without pulp exposure were most commonly found in school children.

The severity of lesions is directly related to the kind of trauma suffered by each patient, ranging from automobile

Table 4 - Distribution of dentoalveolar injuries according to the etiology

<table>
<thead>
<tr>
<th>Etiology</th>
<th>Traffic Accident</th>
<th>Sports Accident</th>
<th>Assault</th>
<th>Fall</th>
<th>Collision with object</th>
<th>Working Site Accident</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alveolar fracture</td>
<td>13</td>
<td>0</td>
<td>7</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Tooth fracture</td>
<td>11</td>
<td>2</td>
<td>2</td>
<td>12</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Root fracture</td>
<td>5</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Avulsion</td>
<td>14</td>
<td>1</td>
<td>2</td>
<td>9</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Intrusion</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Extrusion</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Luxation</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>11</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Concussion</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Subluxation</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
accident (high impact) to a mere fall from his/her own height (low impact). The most severe lesions, such as avulsions and dentoalveolar fractures, may affect the development the patient’s maxillary bones if not properly treated, especially in case of growing-age children. Therefore, the early diagnosis and treatment are of paramount importance.

In some patients, the presence of other associated face fractures and cranioencephalic traumas was observed. A patient reported a rapid loss of consciousness, nausea and posttraumatic headache. Such evidences suggest the need for development of a future study relating the cranioencephalic trauma to the dentoalveolar trauma.

Several measures for the prevention of dentoalveolar trauma may be established. In order to reduce the incidence of traumas due to falls in children, rubber floors could be installed in the places where accidents with children most likely occur, such as school and park playgrounds. For the elderly, installation of helping bars and anti-skid floors would be of great help. Traffic educational programs for car drivers, bicycle drivers and pedestrians alike would reduce the possibility of accidents. To prevent contact sport accidents, the use of mouth protectors is advisable. These are some of the possible measures to reduce the incidence of dentoalveolar traumas.

CONCLUSION

Based on the findings and numbers of this prospective study performed in the largest hospital complex in Latin America, it may be concluded that dentoalveolar trauma was most common in male patients and predominantly occurred within the first decade of life, mainly due to falls. Avulsion and coronal/crown-root fractures were the most common types of dentoalveolar traumatic injuries. The incidence of dentoalveolar trauma decreased with age and the main etiologic factors in adult patients were traffic accidents and physical aggression.

REFERENCES


