Traumatized anterior teeth in Southwest coastal population of India
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Abstract
Background: The objectives of this study were to measure the prevalence of anterior tooth fracture in the Southwest coastal population and to study association with predisposing factors such as molar relationship, overjet, and variables such as age, gender, location, occupation, and etiology.
Aim: The aim of the study was to evaluate the prevalence of anterior tooth fracture due to trauma in 1000 patients from the Southwest coastal population.
Materials and Methods: The study was conducted on 1000 patients reporting for treatment to A B Shetty Memorial Institute of Dental Sciences and rural satellite centers from June to December 2016. Patients who had anterior tooth fracture were questioned with a standard questionnaire from Oral Health Survey WHO format 2013. Results were evaluated using Pearson's Chi-square test.
Results: Out of the 1000 patients examined, traumatized anterior teeth were seen in 89 (8.9%) cases. The prevalence of trauma to the anterior teeth was more in the male population (51.7%). Traumatized anterior teeth were frequent in the age group of 20-30 years (33.5%). Fall and automobile accidents were the most common causes of trauma to the anterior teeth (3.6%). The maxillary right (4.4%) and the maxillary left (4.2%) central incisors were most susceptible to trauma. 3.8% of teeth showed enamel fracture only, and 2.1% showed enamel and dentine fracture and 1.6% cases showed total loss of tooth due to trauma. Maximum number of patients with anterior tooth trauma was seen to have Class I malocclusion (88.8%), and an overjet in the range of 2-4 mm (66.3%).
Conclusion: Anterior tooth trauma in the Southwest coastal population was seen to be highly prevalent in the age group of 20-30 years and predominantly in males with automobile accidents being the most common cause. The maxillary anterior teeth were seen to be frequently affected. Enamel fractures were common, but the turn up for treatment posttrauma was negligible.
Clinical Significance: This study correlates the presence of anterior teeth trauma to various behavioral, physical, and dental attributes. Majority of the cases were reported in rural areas, and the masses were ignorant about the consequences of trauma to anterior teeth and the treatment options available.

Keywords
Dental trauma, falls, fracture, prevalence, traumatized incisors

Introduction
Injury to the teeth or oral cavity can lead to dental trauma. It is a phenomenon with no definite etiology, associated with factors such as oral environment and human behavior.[1] In permanent dentition, they are frequently seen as enamel fractures and enamel and dentine fractures.[2] In primary dentition, the greatest incidence of trauma occurs at 2-3 years of age.[3] In the age group of 5-7 years, when permanent precursors continue to develop, it is a dental emergency which requires immediate care and management.[4] Any injury that causes a slight disfigurement of the patient's appearance as well as function imparts deep psychological impact.

Complex factors may be involved in the prevalence of dental trauma. The type of occupation and sport or recreational activities available in a particular region may pose as risk factors.[5]
Based on studies done at different geographical locations and age groups, trauma to the anterior teeth is a serious dental health concern. There may be significant variations in the risk factors that may play a role in the cause and outcome of dental trauma between communities.\(^6\) A better knowledge and understanding of the factors unique to our geographical area can help in preparing dental students and the local dental practitioners in better management of dental trauma.

Hence, the objective of this study was to measure the prevalence and to evaluate the risk factors involved in anterior teeth fracture in Southwest coastal population in 2016.

Materials and Methods

Based on 15% prevalence, 95% confidence level and precision (estimation error) of 2.3%, using the G Power software the minimum sample size needed was 926.

Institutional ethical clearance was obtained and the study was conducted on 1000 patients, reporting to the outpatient department of A B Shetty Memorial Institute of Dental Sciences, Nitte University and the associated rural satellite centers, Mangalore from June to September 2016. Informed consents were obtained and patients with anterior tooth fractures were questioned with a standard questionnaire from Oral Health Survey WHO format 2013. Patients were examined under good illumination using sterile diagnostic instruments.

The scoring criteria according to the WHO classification are as follows:

<table>
<thead>
<tr>
<th>Score</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No sign of injury</td>
</tr>
<tr>
<td>1</td>
<td>Treated injury</td>
</tr>
<tr>
<td>2</td>
<td>Enamel fracture only</td>
</tr>
<tr>
<td>3</td>
<td>Enamel and dentin fracture</td>
</tr>
<tr>
<td>4</td>
<td>Pulp involvement</td>
</tr>
<tr>
<td>5</td>
<td>Missing tooth due to trauma</td>
</tr>
<tr>
<td>6</td>
<td>Other damage</td>
</tr>
<tr>
<td>9</td>
<td>Excluded tooth</td>
</tr>
</tbody>
</table>

Inclusion criteria

Patients aged 15-70 years.

Exclusion criteria

- Fixed orthodontic treatment
- Recent history of maxillofacial trauma
- Differently abled patients.

Statistical analysis

Data obtained were analyzed using Statistical Package for Social Sciences version 16.0. Differences between variables were analyzed using the Pearson’s Chi-square test. \(P <0.005\) was considered to be statistically significant.

Results

Traumatized anterior teeth were seen in 89 (8.9%) [Table 1] of the 1000 cases examined of which 517 were males, and 483 were females. The prevalence was more in the male population (70.8%) compared to the female population (29.2%) where \(P < 0.05\), which is statistically significant [Graph 1]. Statistically significant difference (\(P > 0.05\)) was seen in the prevalence of trauma in urban population (48.8%) and rural population (51.2%) [Graph 1]. Traumatized anterior teeth were seen in 33.5% of 20-30 years’ age group followed by 23.6% in the age group of 30-40 years and 10.7% in the age group of <20, which was not statistically significant [Graph 1]. 4.9% of the population showed single tooth fractures, whereas 3.2% and 0.8% of the population showed fracture of two and three teeth, respectively. Fall, automobile accidents (3.6%), and sports accidents (1.7%) were the most common causes of trauma. Teeth most susceptible to fracture were maxillary right (4.4%) and left (4.2%) central incisors followed by mandibular left central incisor (1.8%). Enamel fracture was seen in 3.8%, and 2.1% showed enamel and dentine fracture and 1.6% cases showed total loss of tooth due to trauma [Table 2]. Discoloration was reported in 2.4% of the cases. Only 2.6% of the population had sought dental treatment after trauma. Maximum number of patients with anterior tooth trauma were had Class I malocclusion (88.8%) and an overjet in the range of 2-4 mm (66.3%) [Graph 2].

Discussion

This survey indicated an 8.9% prevalence of traumatized anterior teeth in 1000 patients of the Southwest coastal population. In a study conducted by Hegde and Sajnani, in the same geographical location in 2013, the overall prevalence was found to be 14.85% in 2000 patients.\(^7\) Lower prevalence detected in our study may be due to smaller study population or due to the fact that
Maximum prevalence of traumatized anterior teeth was seen to be due to falls and automobile accidents (3.6%) followed by sports accidents (1.7%). In a study done by Baldava and Anup, sports accidents were seen to be a common cause of fractures among the 370 male candidates examined.\cite{13} The maxillary right central incisor was the most affected tooth (4.4%) followed by the maxillary left central incisor (4.2%). This is in accordance with the findings of Hegde and Shabin and Dosdoğru et al.\cite{1,14} El-Kenany et al. in their study also suggest biting and teeth misuse and home abuse as possible causes of tooth fracture.\cite{15} Single tooth fractures (4.9%) were frequently reported followed by fracture of two teeth (3.2%) and three teeth (0.8%). In the present study, automobile accidents were seen to cause fracture of two or more teeth. Discoloration is seen as a delayed response to trauma. Only 2.4% reported discolored teeth, indicating that most traumatized teeth remain vital. Only a small fraction of the population had sought treatment for traumatized teeth. Individuals with enamel fracture only consider treatment only if symptomatic or if it interferes with esthetics. In the Enabulele et al. study conducted in Nigeria, majority of patients in the age groups ≤20 and 51-60 sought treatment because of pain, while the majority of those in the age groups 21-30 and 31-40 sought treatment because of aesthetic considerations.\cite{5} Hegde and Sajnani have reported a higher population (20.2%) seeking treatment, and in a study done by Punja et al. high rate of replacement of the missing anterior tooth was recorded.\cite{16} Anterior tooth trauma was frequently seen in cases of Class I malocclusion with an overjet of 2-4 mm, this observation was not in accordance with the findings of the study by Hegde and Sajnani and Dosdoğru et al. where anterior tooth trauma was seen frequently in cases of angles Class I Division II.\cite{17,14} In another study conducted by El-Kenany et al., in Egypt trauma to anterior teeth was seen in cases of angles Class II and an overjet of >4 mm.\cite{14} Therefore, increased overjet has been found to be associated with increased severity of fractures, this enhanced risk is confirmed with previous studies.\cite{17} The association of lip coverage and anterior teeth trauma was not assessed in the present study. However, lip incompetence was found to be a major contributing factor in the study done by Ain et al. in Kashmir.\cite{18} Children with inadequate lip coverage were found to more susceptible to anterior tooth trauma. This finding was in accordance with other studies which suggest that lips in a competent position, impart a protective effect to the anterior teeth by acting like a cushion and protecting the anterior teeth from traumatic forces.\cite{19}
However, in the present study, certain behavioral and social factors such as oral hygiene habits, adverse oral habits, diet, and profession were also assessed but no statistically significant correlations were seen between these factors and anterior tooth trauma.

Conclusion
A high prevalence of traumatic injuries to the anterior teeth were recorded in the age group of 20-30 years and predominantly in males and automobile accidents were the most common cause. Since majority of the cases were reported in rural areas, it is necessary to educate the masses about dental trauma, its sequelae, and the treatment options. The limitations of this study include the smaller study population considered and failure to record the type of treatment received for anterior tooth fractures.

References