INTRODUCTION

Dental trauma is a common health problem among children and teenagers worldwide. Maxillary incisors are more prone to traumatic injuries, which lead to psychological problems among children. The lack of awareness regarding traumatic injuries and associated risks is evident in public. In addition, people are not aware of preventive measures of dental trauma. Generally the incidence of dental trauma is underestimated by health professionals including dentists. Most clinicians prefer treatment rather than preventive measures of traumatic injuries.1

Traumatic dental injury (TDI) mostly occurs in children and teenagers due to falls, sport injuries, and violence.2-3 Trauma to oral structures is the sixth most common injury of the body.4 The proportion of tooth injury varies from 4% to 33% worldwide.5-6 It has been reported by various investigators that most dental injuries occur during first two decades of life, usually around 8-12 years.7 The occurrence of trauma is significantly higher in maxillary central incisors followed by maxillary lateral incisors and mandibular incisors.7-8 Incidence of coronal trauma is higher in boys as compared to girls.

Generally, prevalence of tooth trauma has not been...
researched much in comparison to periodontal problems and caries. Although, many research articles published internationally on the epidemiology of traumatic injury of anterior teeth, but not a single article on the above mentioned area has published in Pakistan according to authors’ knowledge. The objective of this study is to observe the pattern of coronal trauma in 9-18 years old children.

**METHODOLOGY**

This cross sectional study was conducted to observe the pattern of dental trauma in students of rural areas of KhairpurMirs District, Sindh, Pakistan studying in primary to higher secondary (private & public) schools. Nine public and 4 private schools of district khairpur from 04 October 2010 to 20 December 2010 were included in this study. The schools were selected in accordance with the number of schoolchildren registered in that particular community. A sample size of 322 children from 331658 schoolchildren was chosen using a statistical calculation. A randomized selection of the schools and children was made in the current study. Students of age from 9-18 years of either gender & dentition participated the current study. Whereas the students above the age of 18 years, the students below the 14 years whose parents/guardians refused to participate in this research study and students with amelogenesisimperfecta and dentinogenesisimperfecta were excluded. Out of 2000 students 1904 students (males and females) fulfilled the inclusion criteria. All of them were examined with disposable tongue spatula under daylight by a single examiner. Radiographic examination for the root fracture was not conducted. However, treatment taken was recorded.

Fractures of anterior teeth were clinically recorded according to the following classification based on clinical signs.

- **Class 1** Enamel fracture only
- **Class 2** Enamel and dentine fracture but no pulp involvement
- **Class 3** Enamel and dentine fracture with pulp involvement
- **Class 4** Restored tooth with either composite or crown following fracture

Data with regards to sex, age, tooth involved, number of involved teeth, affected coronal portion and treatment taken for coronal trauma were recorded. For testing the statistical differences of coronal trauma in relation to age, gender and prevalence of fractured teeth and its anatomic site, Chi square test was used.

**RESULTS**

Among the study groups examined, 4.32% males and 3.28% females presented with crown fractures. An occurrence of crown fractures of 4.7% and 3.7% was found in the age group 9-12 years (mixed dentition) and 13-18 (permanent dentition) respectively. None of the students with coronal trauma received any therapeutic measure. No statistically significant difference in coronal trauma in relation to age groups and sex was identified as shown in Table 1.

**TABLE 1: PREVALENCE OF FRACTURED TEETH AND TREATMENT RECEIVED IN RELATION WITH AGE & GENDER.**

<table>
<thead>
<tr>
<th>Age group (Years)</th>
<th>MALES</th>
<th>FEMALES</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of students examined</td>
<td>No. of students with fractures</td>
<td>Fractured teeth Prevalence %</td>
</tr>
<tr>
<td>9-12</td>
<td>330</td>
<td>20</td>
<td>6.06</td>
</tr>
<tr>
<td>13-18</td>
<td>965</td>
<td>36</td>
<td>3.73</td>
</tr>
<tr>
<td>Total</td>
<td>1295</td>
<td>56</td>
<td>4.32</td>
</tr>
</tbody>
</table>

Maxillary central incisor was the most commonly affected
tooth (64.47%) followed by maxillary lateral incisor (10.52%), mandibular central incisor (7.89%), mandibular lateral incisor (5.26%), maxillary canine (2.63%) and mandibular canine (1.31%). In majority of the cases, trauma in a single tooth was identified while only five students reported involvement of two teeth. None of the child presented with three or more affected teeth (Table 2).

TABLE 2: CORONAL TRAUMA INVOLVING TEETH

<table>
<thead>
<tr>
<th>Teeth involvement</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maxillary Central Incisor</td>
<td>49</td>
<td>64.47</td>
</tr>
<tr>
<td>Maxillary Lateral Incisor</td>
<td>8</td>
<td>10.52</td>
</tr>
<tr>
<td>Maxillary Canine</td>
<td>2</td>
<td>2.63</td>
</tr>
<tr>
<td>Mandibular Central Incisor</td>
<td>6</td>
<td>7.89</td>
</tr>
<tr>
<td>Mandibular Lateral Incisor</td>
<td>4</td>
<td>5.26</td>
</tr>
<tr>
<td>Mandibular Canine</td>
<td>1</td>
<td>1.31</td>
</tr>
<tr>
<td>Max Central and Central</td>
<td>4</td>
<td>5.26</td>
</tr>
<tr>
<td>Max Central and Lateral</td>
<td>1</td>
<td>1.31</td>
</tr>
<tr>
<td>Mandibular Central and Central</td>
<td>1</td>
<td>1.31</td>
</tr>
<tr>
<td>Total</td>
<td>76</td>
<td>100</td>
</tr>
</tbody>
</table>

In terms of anatomic tooth structures, 52.6% fracture was observed in enamel, whereas enamel & dentine fracture with the involvement of pulp was the least common site of crown fracture (Table 3).

TABLE 3: CORONAL TRAUMA INVOLVING ANATOMIC STRUCTURE OF TOOTH

<table>
<thead>
<tr>
<th>Anatomic location of fracture</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enamel Only</td>
<td>40</td>
<td>52.6</td>
</tr>
<tr>
<td>Enamel &amp; Dentine Without Pulp Involvement</td>
<td>28</td>
<td>36.8</td>
</tr>
<tr>
<td>Enamel &amp; Dentine With Pulp Involvement</td>
<td>8</td>
<td>10.5</td>
</tr>
<tr>
<td>Tooth Restored With Composite Or Crown Following Fracture</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>76</td>
<td>100</td>
</tr>
</tbody>
</table>

DISCUSSION

In the current survey pattern of crown fractures in schoolchildren of District Khairpur Mirs, Province Sindh, Pakistan was evaluated. The ultimate goal was to highlight the facts and figures which may assist the policy makers in the designing of appropriate preventive measures. Overall, a low occurrence of coronal trauma was found in the current survey, and was relatively lower than old Americans identified in NHANES III study. This variation among surveys may be attributed to differences in sampling techniques employed. Moreover, present study did not record any previous trauma history such as avulsed teeth, which may have underrated the prevalence of trauma. Current study suggested that girls are relatively less affected by coronal trauma compared with boys and is in agreement with other studies. Where study by Garcia-Godoy et al. contradict such findings since they observed higher rate of coronal trauma in girls in comparison to boys. The male to female ratio (1.31) identified in this survey is nearly equal to that of the US inhabitants, 1.51. The male/ female coronal trauma prevalence ratio stated in other researches ranged from 1.35 and 2.1 in Jordan and Syria respectively. This may possibly as a result of that males have a tendency to take part in more tough activities for instance , contact sports and more destructive types of games.

In our study prevalence of coronal fracture among age group 9-12 was 4.7%, which is not in agreement with study results of Marcenes et al among school students of same age group while in age group 13-18 prevalence was 3.73% which is also not in agreement with the study results of Faus-damia M et al. Variations in the prevalence of dental injuries in mixed and permanent dentitions have been attributed to a number of aspects, for example study type, the diagnosis methodology age groups, composition of sample composition, the dentition studied, geographic discrepancy between study settings and countries. It is evident in the literature that majority of children with coronal trauma did not consult any dental personnel and also most traumatized teeth remained untreated. In this study none of the affected student received dental treatment which suggests the possible reasons namely, lack of dental facilities available in that area, unawareness about dental trauma and its management, huge treatment expenses and no set insurance policies to cover all expenses. The maxillary central incisors suffered from coronal trauma significantly greater than other teeth which is in accordance with other researches. Also, the present study is in
agreement with other surveys where single tooth fractures were identified substantially greater than multiple teeth fractures.\textsuperscript{10,17} Bastone et al\textsuperscript{15} reported multiple teeth injuries are mostly evident in hospital emergency rooms. The prominent location of the maxillary incisors is responsible for fractures than the lower teeth.\textsuperscript{16} Maxillary incisors with an increased over-jet or protruding incisors\textsuperscript{13,15,16,29} incompetent lips\textsuperscript{13,15,29} and accident susceptibility are also major factors involved in coronal trauma.\textsuperscript{15,16,29}

The maxillary central incisors were the most frequently injured teeth in all studies for both the primary and secondary dentitions\textsuperscript{15}. The 2\textsuperscript{nd} frequently tooth was maxillary lateral incisors in all studies except that by Forsberg and Tedestam\textsuperscript{30} where mandibular central incisors were the second most frequently injured teeth. Enamel was the most common site of trauma 52.6\%, followed by trauma in enamel and dentin without pulp involvement.

Several articles have also reported similar features as above.\textsuperscript{31,32}

\section*{CONCLUSION}

The findings of this study suggest an overall 4\% prevalence of coronal trauma among 9-18 year-old students in district khairpurMirs, Sindh, Pakistan. Males (4.32\%) were more susceptible to coronal trauma compared with females (3.28\%). The commonly involved teeth and tooth structure were maxillary central incisors (64.47\%) and enamel (52.6\%) respectively.

\section*{RECOMMENDATIONS}

Further investigations with regard to factors associated with coronal trauma are warranted. Dental education of the public, parents, teachers and health professionals regarding methods of preventing dental injuries in children is required. It would aid in designing polices to reduce the rate of dental traumatic injuries in Pakistan. Measures to correct over-jet and incompetent lips(orthodontic treatment) to minimize trauma to maxillary central incisors be taken by the government.

\section*{REFERENCES}

9. Ellis RG, Davey KW. The classification and treatment of injuries to the teeth of children. 5th ed, Year Book Publisher, Chicago.1970; 1-231.
16. Oluwole TO, Leverett DH. Clinical and epidemiological