

## PATTERN AND CAUSES OF TRAUMATIC INJURIES TO PERMANENT TEETH IN CHILDREN OF AGE 7 TO 14 YEARS

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### ABSTRACT

**Background and Objective:** The aim of this study was to determine the pattern and causes of traumatic dental injuries (TDIs) to permanent teeth in children of age 7 to 14 years.

**Methods:** An analytical cross sectional study was carried out from July 2016 to June 2017. A total of 79 injured teeth in 58 patients were included in this study. The Federation Dentaire Internationale System of tooth numbering and Ellis's classification of traumatic dental injuries (TDI's) was used for teeth fractures. Kruskal-Wallis and Mann-Whitney U tests were used to assess pattern of injury and type of teeth involved. P value  $\leq 0.05$  was considered significant.

**Results:** Boys had more injuries as compared to girls with ratio of 1.4:1. The most frequent age involved was 12 years. Amongst causes; fall was the most common cause (39.24%) followed by accident (24.05%) and bicycle (17.72%). The most prevalent tooth involved was right maxillary central incisor  $n = 26$  (32.91%,  $p = 0.001$ ) and Ellis's classification III (37.97%,  $p = .001$ ) of teeth fracture was common.

**Conclusion:** The study concluded that the most frequent cause was fall and right central incisor and Ellis's II classification were the most common amongst traumatic dental injuries.

**Keywords:** Dental traumatic injuries, Central incisor, Permanent teeth, Risk factors, Pakistan.

### INTRODUCTION

Traumatic dental injuries (TDIs) is an enclosed injury to the teeth or the oral cavity resulted from an external impact on the teeth and surrounding tissues that occur suddenly and usually require prompt care.<sup>1</sup> TDIs often involve anterior teeth that may cause restriction in biting, phonetics, esthetics as well as social and psychological effects. The cost involved for the correction is the further complication encounter by those having TDIs.<sup>2</sup>

The prevalence of TDIs is very high in children and most of the children that are affected by TDIs seen in between ages of 8 and 11 years.<sup>3</sup> The incidence of maxillary teeth involvement is 48% – 60%. Nineteen percent of the injuries occur due to fall elsewhere while over 16% are reported to happen in the school environment.<sup>4</sup> Primary tooth involvement is 30% while 20% permanent dentition sustain injuries.<sup>5</sup> Epidemiological studies show that the prevalence of TDIs will soon surpass caries and periodontal disease among children.<sup>6</sup> The major causes of TDIs despite of severity are falls, being struck by an object, bicycle accidents, assaults, and motor vehicle accidents.<sup>7,8</sup>

The prognosis of traumatized teeth depends on the sudden and suitable treatment.<sup>9</sup> Prompt care is required for avulsed permanent teeth as the prognosis is better if transplanted within 30 minutes and further depends on the periodontal ligaments attached to the

tooth.<sup>10</sup> The role of school teachers and parents in this regard is very important and because of knowledge inadequacy about TDIs in teachers and parents their attitude does not bring reduction in TDIs.<sup>11,12</sup>

Thus, it is imperative to carried out a study which reveals not only the pattern and causes of TDIs but also the type of TDI sage and teeth involved in order to contribute effective strategies regarding dental injuries in permanent teeth. The aim of this study is to determine the pattern, causes and age involved in TDIs in permanent teeth amongst 7 – 14 years old children.

### METHODOLOGY

An analytical cross-sectional study was carried out in the Department of Oral and Maxillofacial Surgery, Sardar Begum Dental College and Hospital, Peshawar from July 2016 to June 2017. A total of 79 permanent injured teeth in 58 patients through convenience sampling technique were selected. After taking informed consent from the patient, a well-documented proforma having demography and history of the complaint were elicited. The face was thoroughly cleaned with warm water or swabs before going to clinical examination. All the information regarding gender, age, number of injured teeth, type of the teeth, type of injury and cause of injury was carefully recorded. The Federation Dentaire Internationale (FDI) system of tooth num-

bering was followed in the study. The examination was done using Ellis’s classification of TDIs.<sup>13,14</sup> Intra-oral periapical (IOPA) x-rays and vitality tests were carried out where deemed necessary. The data was analyzed using SPSS 22.0. Mean and standard deviation was computed for quantitative variable like age. Frequency and percentage were calculated for qualitative variables like gender, risk factors and pattern of trauma. Kruskal-Wallis and Mann–Whitney U tests were used to compare pattern of traumatic dental injuries and type of teeth involved. *P* value ≤ 0.05 was considered significant.

**RESULTS**

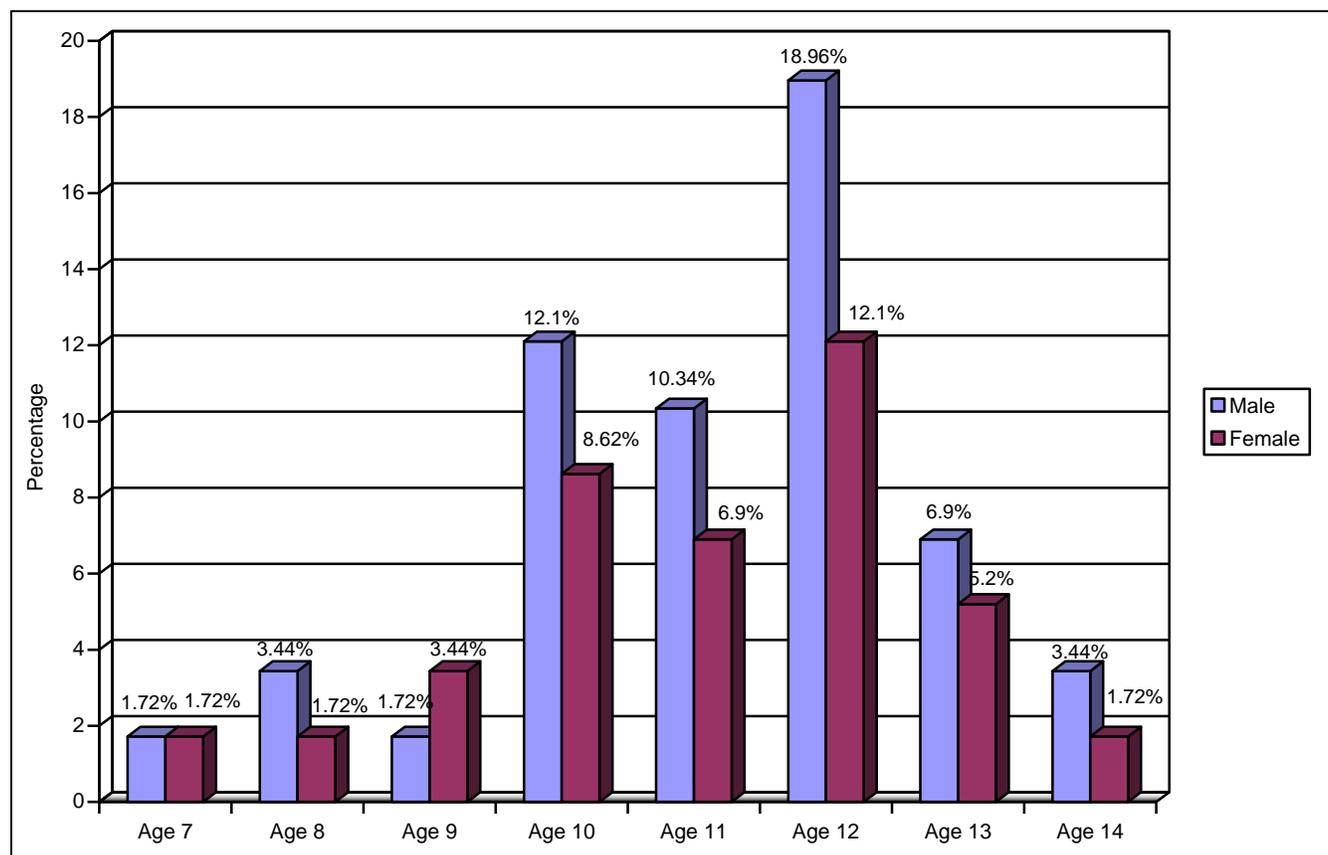
The mean age at presentation was 10.5 ± 2.5 years. The most frequent gender involved was male (n = 34, 58.62%) and female (n = 24, 41.38%) with a male to female ratio was 1.4:1. The total teeth affected were 79. The most common age involved was 12 years age in both genders, male = 18.96%, female = 12.1% followed by 10 years age in male 12.1% and in female 8.62% as shown in the figure 1. From 79 cases of traumatic injuries, in 31 cases (39.24%), the cause of trauma was found to be fall as shown in the figure 2. The most common TDIs in Ellis classification were class III with 37.97% (p = .001, Kruskal-Wallis test) followed by class

II with 18.98% (p = .040, Kruskal-Wallis test). The most frequent tooth involved were right maxillary central incisor with n = 26, 32.91% (p = .001, Mann–Whitney U test) followed by left maxillary central incisor; n = 14, 17.72% (p = .045, Mann–Whitney U test). The least commonly involved tooth were mandibular left central incisor; n = 05 (6.3%) as shown in the table 1.

**DISCUSSION**

This cross sectional study has identified high prevalence in male than female and male to female ratio was 1.4:1. This study was in accordance with the results of the study conducted by Hedge et al<sup>15</sup> in which male to female ratio was 1.6:1 and with study done by Hamdan et al<sup>16</sup> where the male to female ratio was 1.7:1. The reason could be that boys are more prone to participation and involvement in the aggressive sports and outdoor activities. The low prevalence of TDIs in girls can be demonstrated by the fact that the girls are more mature in behavior than boys who are more energetic than girls. However, Gracia Godoy in his study found that the male to female ratio was 0.9:1 which contradict this study.<sup>17</sup>

The findings of the present study demonstrate that the most frequent age involved in children was 10 to 12 years age which is in consistent with study done by



**Fig. 1:** Distribution of Patients according to Age and Gender.

Table 1: Frequency of Injuries according to Tooth Number.

Ellis Classification	12	11	21	22	32	31	41	42	Total	P value*
Class I	02	04	02	01	02	01	0	01	13 (6.5%)	.063
Class II	01	07	03	01	0	0	01	02	15 (18.98%)	.040
Class III	04	10	05	02	03	02	03	01	30 (37.97%)	.063
Class IV	01	02	02	03	01	02	01	01	13 (16.5%)	.063
Class V	0	02	01	0	0	0	02	01	06 (7.6%)	.084
Class VI	0	0	0	0	0	0	0	0	0 (0%)	.105
Class VII	0	01	01	0	0	0	0	0	02 (2.5%)	.145
Total	08 (10.13%)	26 (32.91%)	14 (8.86%)	07 (8.86%)	06 (7.6%)	05 (6.3%)	07 (8.86%)	06 (7.6%)	79 (100%)	
P value <sup>b</sup>	.053	.001	.045	.057	.069	.059	.057	.069		

<sup>a</sup>Kruskal-Wallis test, <sup>b</sup>Mann-Whitney U test. Bold data are statistically significant.

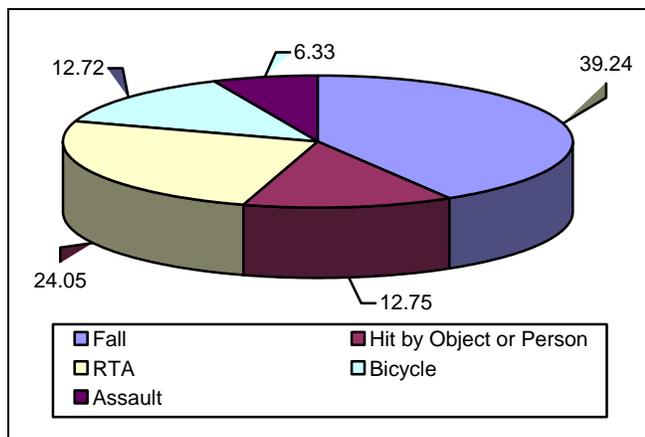


Fig. 2: Percentage of Causes of Trauma.

Govindarajan et al<sup>18</sup> and Vanka et al<sup>19</sup> in which they found that children of age 10 to 13 years were commonly encountered with TDI's while Hedge et al<sup>15</sup> showed that 13 to 14 years age children were most frequently involved which opposes this study. The most common cause of TDIs in this study was fall which is in accordance with study conducted by Vanka et al,<sup>19</sup> Rai et al<sup>20</sup> and Dua et al<sup>21</sup> in which they found fall as the most common cause of TDIs. The second most common cause in our study was RTA which is not in consistent with study by Hedge et al.<sup>15</sup> The reason could be that children are more aggressive and take participation in outdoor activities.

The right maxillary central incisor was the most frequently involved tooth in this study which accounted for 32.91% of TDIs followed by left maxillary central incisor with 17.72% and was statistically significant with TDIs. The present study is in argument with study

conducted by Vanka et al<sup>19</sup> in which they found right central incisor tooth to be the most prevalent with 39% of injuries. The Ellis classification III was high in this study (37.97%) followed by II (18.98%) and was statistically significant. This study is unlikely with the results of the study conducted by Gracia Godoy<sup>17</sup> in which he showed that enamel fracture was the high in TDIs which opposes this. However, Rajab et al<sup>22</sup> reported that the most common injury found was to be enamel and dentin fracture which is in agreement with this study.

The limitation of this study was that cause of injury may be different in girls than boys and in this study it was not discussed individually. The more over jet and lip incompetency in which more injuries to the teeth may be encountered were not discussed. Also the socioeconomic status of the patients were not elaborated which may affect the study. Apart from these limitations this study thoroughly evaluated the cause and pattern of TDIs in children. Studies are needed to know the factors that increase the TDIs to permanent teeth in children.

It is **concluded** that most frequently involved tooth amongst traumatic dental injuries was right maxillary central incisor and age involved were 10 to 12 years age. The most common cause of TDIs in permanent teeth was fall and Ellis classification II and III were the most prevalent injuries to the permanent incisor teeth in children of age 7 to 14 years.

A policy at the community level is mandatory which may include the education about the various modalities of avoiding TDIs. An interaction between school teachers and parents is necessary in order to encourage them to report the TDIs to the dentist at earliest.

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None to declare.

**Conflict of Interest**

None to declare.

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