



**PREVALENCE OF TRAUMATIC DENTAL INJURIES AMONG
SCHOOL CHILDREN - AN INSTITUTIONAL STUDY****APARNA M¹, SRINIVASAN SR^{2*} AND RAKSHAGAN V³**

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***Corresponding Author: E Mail: Dr. Samuel Raj Srinivasan: samuelrajs.sdc@saveetha.com**Received 20th March 2021; Revised 26th April, 2021; Accepted 24th May 2021; Available online 1st Aug. 2021<https://doi.org/10.31032/IJBPAS/2021/10.8.1091>**ABSTRACT**

Dental trauma refers to an injury to the teeth and/or other hard and soft tissues within and around the vicinity of the oral cavity. It results in functional, aesthetic and psychological disturbances among children. Involvement of children in sports activities, accidents are considered to be the major risk factors which lead to the cause of various traumatic dental injuries and these factors have contributed to transform these injuries into an important public health problem. The main objective of this study was to determine the prevalence of traumatic dental injury among school children who visited Saveetha Dental College. This was a retrospective study in which sample size was about 998. It was conducted among school children aged from 8 to 17 years, who came for dental check-up at Saveetha Dental College, Chennai Excel tabulation was done and data analysis was performed in SPSS software (Version 26.0). Out of 998 patients only (5.1%) of them had traumatic dental injury (TDI). Males had higher (4.1%) prevalence of traumatic dental injury than females (1%). Most common type of teeth involved in traumatic dental injury was anterior (4.8%). Significant association was not found using chi square analysis in between gender and dental traumatic injury ($p > 0.05$) and whereas p value ($p < 0.05$) was significant while correlating the tooth involved and traumatic dental injury. From the examined population, males had higher prevalence of traumatic dental injury than females and the most common type of teeth involved in traumatic dental injury was anterior teeth. Lesser prevalence rate of traumatic dental injury among the selected population was found. Awareness

programmes based on the prevalence of TDI among both parents and children to be conducted. Prevention through various health promotions and correction of predisposing risk factors should be carried out to minimize the prevalence of dental injury.

Keywords: Anterior teeth, Dental injuries, Prevalence, School children, Trauma

INTRODUCTION

Traumatic dental injury is a challenging and neglected public health problem for dental professionals [1]. Untreated oral diseases which occur in children frequently leads to serious general health problem, significant pain and interference with day to day activities of the child [2]. Dental injuries may occur throughout life, but traumatic dental injuries are considered to be a very significant problem among children [3, 4], as falls and collisions, sporting activities, violence and accidents are more common among school going children [5]. In addition to pain and possible infection, the consequences of dental trauma includes alteration in physical appearance, speech defects, alteration in biological, socio - economic, psychological, behavioural factors and emotional impacts, thus affecting the quality of child's life [6-8]. The predisposing dental risk factors includes increased incisal over jet, open bite, protrusion and lip incompetence [9].

An untreated fracture of an anterior tooth among a child can affect the behaviour of a child, his or her progress in school, and can also have significant impact on their daily living [10-12]. Therefore, it is a dental

emergency situation among school children and it requires immediate assessment and management [13, 14]. Traumatic dental injuries in permanent teeth are at risk as it may continue to develop malocclusion and several tooth discrepancies which may cause unaesthetic appearance among school children [15, 16]. So that the treatment aspects must be carefully planned, requiring several follow-up appointments, mainly due to the possible appearance sequels in the developing permanent dentition [17-19].

Hence, the purpose of the current study was to determine the prevalence of traumatic dental injuries among school children who reported to Saveetha Dental College, Chennai.

MATERIALS AND METHODS

The current study was an institutional study which was carried out in Saveetha Dental College. Ethical clearance was obtained from the institutional ethical committee (ethical approval number - SDC/SIHEC/2020/DIASDATA/0619-0320). A total of 998 dental records of school children aged from 8 to 17 years, who had visited the institution for dental check up from June 2019 to March 2020

were reviewed and the dental data regarding the patient's history or chief complaining of dental trauma were retrieved. Data collected was cross checked and verified by an examiner to avoid any missing records.

Data collection includes various parameters such as age, gender, tooth involved and the type of injury. Injury to teeth were classified based on Ellis classification. Ellis classification of dental traumatic injury is a simplified classification, which groups many injuries and allows for subjective interpretation by including broad terms such as simple or extensive or extensive fractures. Therefore it's classification includes, Class I - simple crown fracture with little or no dentin affected, Class II - Extensive crown fracture with considerable loss of dentin, but with the pulp not affected, Class III - Extensive crown fracture with considerable loss of dentin and pulp exposure, Class IV – Devitalised tooth with or without loss of tooth structure, Class V - Teeth lost as a result of trauma, Class VI - Root fracture with or without the loss of crown structure, Class VII - Displacement of the tooth with neither root nor crown fracture, Class VIII - Complete crown fracture and its replacement, Class IX - Traumatic injuries of primary teeth. Cross verification of all the diagnosis reports, intra oral pictures and dental case records were done. Data was

entered in Microsoft Excel sheets. Then the data was imported and transferred to a host computer and processed using IBM SPSS (statistical package for social sciences) version 23.0 for software analysis. Descriptive statistics was conducted for all the variables which were defined in the software. Chi-square analysis was used and $P < 0.05$ is considered significant.

RESULTS AND DISCUSSION

Traumatic dental injuries (TDI) are not a result of disease but a consequence of several factors that will accumulate throughout life if not properly treated [20]. For this study, children between 8 and 17 years of age were chosen, as during this period there is the maximum physiological growth and development is seen and as the children are actively involved in a lot of outdoor activities at this age [21, 22].

From a total of 998 children, 5.1% (51 patients) had traumatic dental injuries. Among which 4.1% (41 patients) were males and 1% (10 patients) were females respectively. While correlating the Ellis class I and type of tooth involved, Ellis class I occurred in anterior tooth region was about (1.58%) and occurrence in posterior tooth region was (0.2 %) [Table -1 , Graph - 1]. The distribution of patients by gender showed that males (1.3%) were more affected by Ellis class I fracture than females (0.4%) [Table -2, Graph - 2]. Correlation between gender and Ellis class

II revealed that males are more frequently affected by Ellis class II (1.5%) than females (0.2%) [Table 3, Graph 3]. When, Ellis class II was correlated with the type of tooth involved. Ellis class II was more prevalent in anterior tooth region (1.7%) than in posterior tooth (0%) [Table 4, Graph 4]. The distribution of gender showed that males are more affected (0.9%) by Ellis class III than females (0.3%) [Table -5, Graph -5]. Correlation between Ellis class III and the type of teeth involved was done in which ellis class III in anterior tooth was about (1.1%0) more prevalent than posterior tooth (0.1%) [Table 6, Graph 6].

Distribution of patients by gender showed that males are more affected by Ellis class IV (0.1%) than females (0%) [Table 7, Graph 7]. Correlation between Ellis class IV and the type of tooth involved was done in which Ellis class IV was more common in anterior to

(0.1%) than posteriors (0%) [Table 8, Graph 8]. The distribution of patients by gender showed that males were more affected by Intrusion (0.1%) than females (0%) [Table 9, Graph 9]. Correlation between intrusion and type of tooth involved was done in which intrusion was more common in anterior tooth (0.2%) than in posteriors (0%) [Table 10, Graph 10]. Correlation between gender and extrusion in which males were more

affected by extrusion (0.2%) in females (0%) [Table 11, Graph 11]. While correlating extrusion and type of tooth involved infer that extrusion was more common in anterior tooth (0.2%) than posteriors (0%) [Table 12, Graph 12]. Whereas, while correlating root fracture and gender, males (0.1%) were more affected by root fracture than females (0%) [Table 13, Graph 13]. Correlation of root fracture and type of tooth involved was done, in which root fracture was more common in the anterior tooth (0.1%) than in posteriors (0%) [Table 14, Graph 14]. Therefore, significant association was not found in between gender and dental traumatic injury ($p > 0.05$) and whereas p value ($p < 0.05$) was significant while correlating the tooth involved and traumatic dental injury using chi square test.

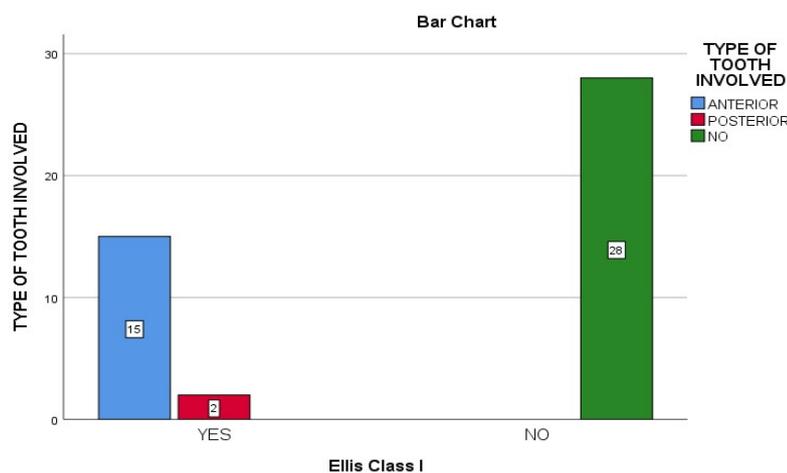
Therefore, in this study, the prevalence of TDI was found to be higher among males (4.1%) than in females (1%). Similar results were obtained in a study done by Ham dan MA *et al.*, which concluded that prevalence of TDI found in males were higher (17.1%) than girls (10.6%) [23]. Various other studies, Rajab LD *et al.*, Nik - Hussain NN *et al.*, Faus - Damia M *et al.* also stated that males were more prevalently affected by TDI than females which was similar to our results [24-26].

Age is another well-established risk factor, and although traumatic dental injury has been reported in all age groups, it is more prevalent in school children [27, 28]. Previous studies have demonstrated that the majority of traumatic dental injury occurs in childhood and adolescence [29], whereas in our study we had included children between the age group of 8 to 17 years of age and the presence of TDI among the selected population was not correlated with the age group.

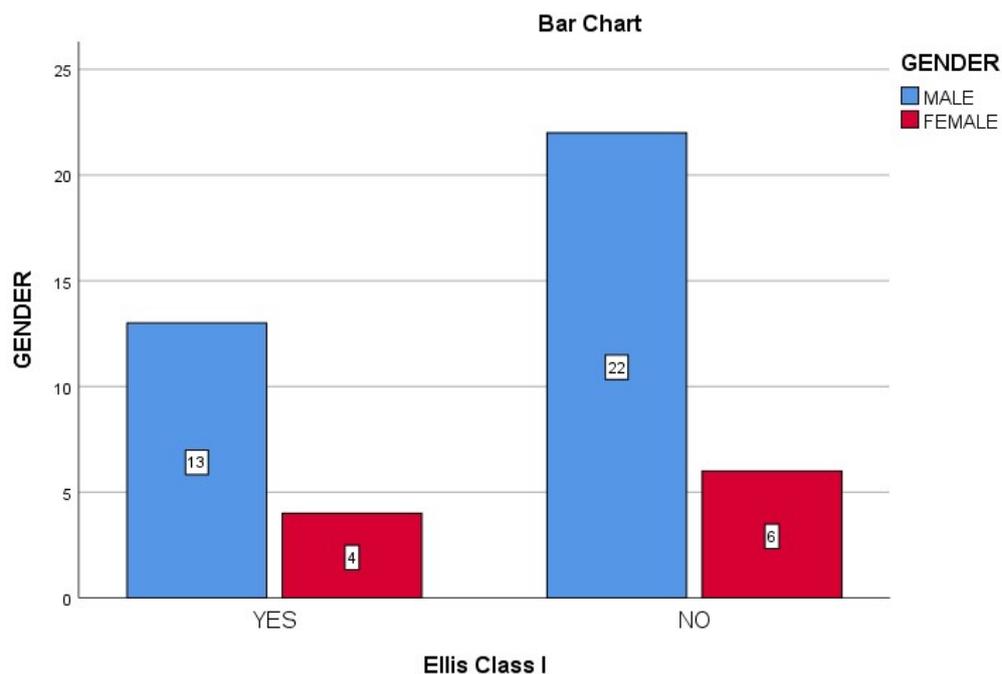
The most common type of injury recorded in the present study was ellis class I and class II (1.71%), whereas it is in line with the studies conducted by Dua R, Sharma S *et al* [30] in which enamel fracture was found to be the common type of injury. Common type of teeth involved in traumatic dental injuries in the study stated that anterior tooth was more prevalently affected by traumatic dental injuries.

Similarly, several studies [31, 32] reveal that maxillary central incisors were most frequently injured teeth. Therefore lesser prevalence rate of traumatic dental injuries among school children was reported by examining the dental records of children who visited Saveetha Dental College, Chennai.

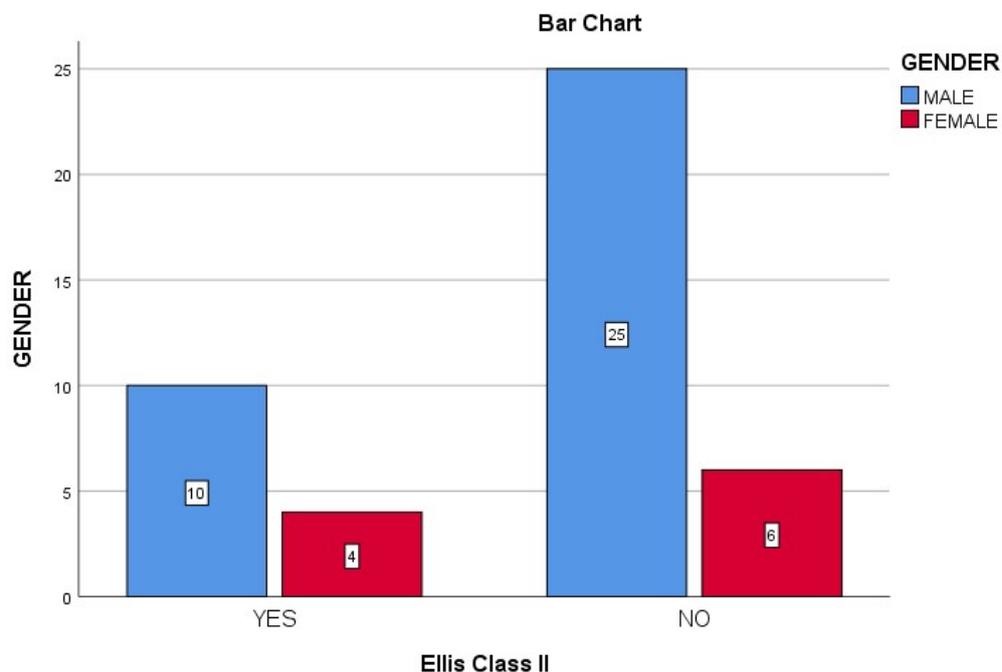
There are several studies in the literature which have a larger number of sample sizes [33, 34]. Whereas, this is considered to be the limitation of our study in which the sample size is restricted only to an institutional set up among the Chennai population. Various causes of traumatic dental injuries were not compared and assessed [35]. Therefore, larger study samples to be evaluated and the study could have been assessed among different geographic locations for more accurate results.



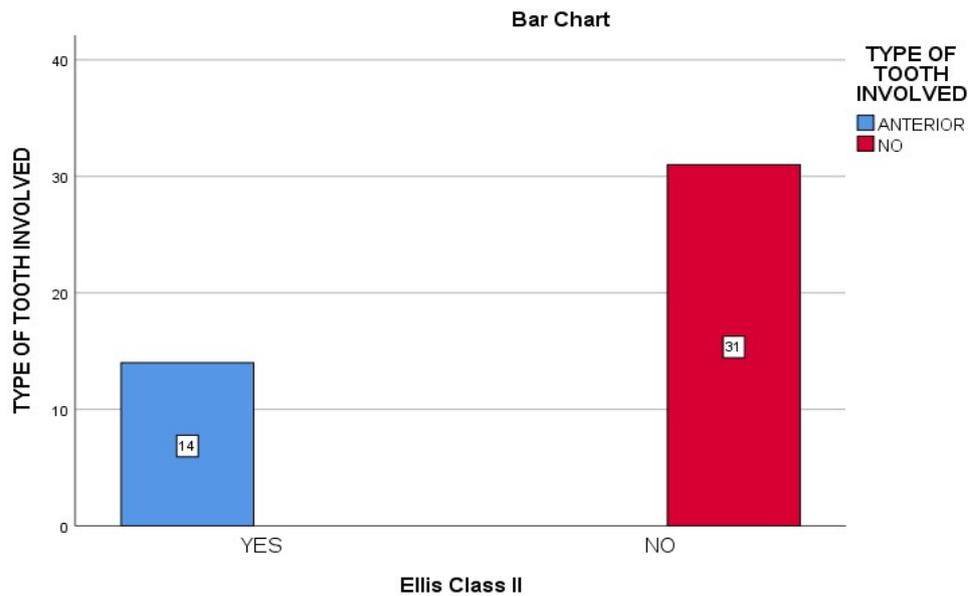
Graph 1: Bar graph showing the correlation between ellis class I and type of tooth involved among patients with ellis class I. X axis represents patients with ellis class I. Y axis represents the type of tooth involved among patients with ellis class I [anterior (blue),posterior (red), no tooth involved (green)]. The frequency of ellis class I fracture occurring in the anterior tooth region was greater as compared to posterior tooth and this difference was statistically significant when assessed using chi square test [chi square value - 45.000; P value = 0.001].



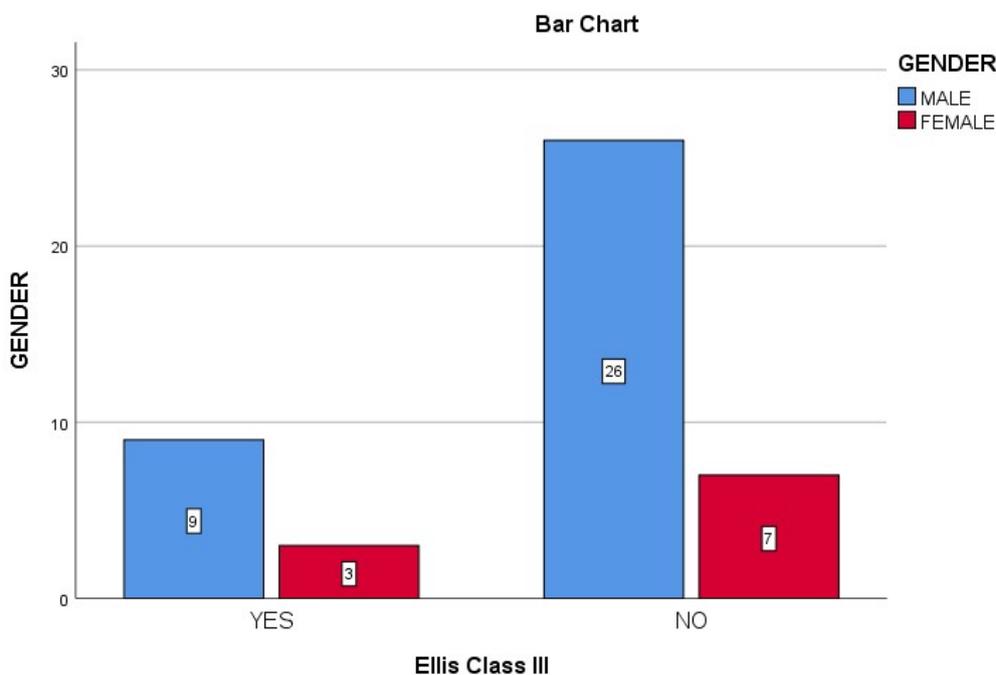
Graph 2: Bar graph showing the correlation between ellis class I and gender distribution. X axis represents patients with ellis class I. Y axis represents the gender distribution among patients with ellis class I [Males , females]. The frequency of ellis class I fracture occurring among males (blue) was greater as compared to females (red) and this difference was not statistically significant when assessed using chi square test [Chi square value - 0.27; P value = 0.869].



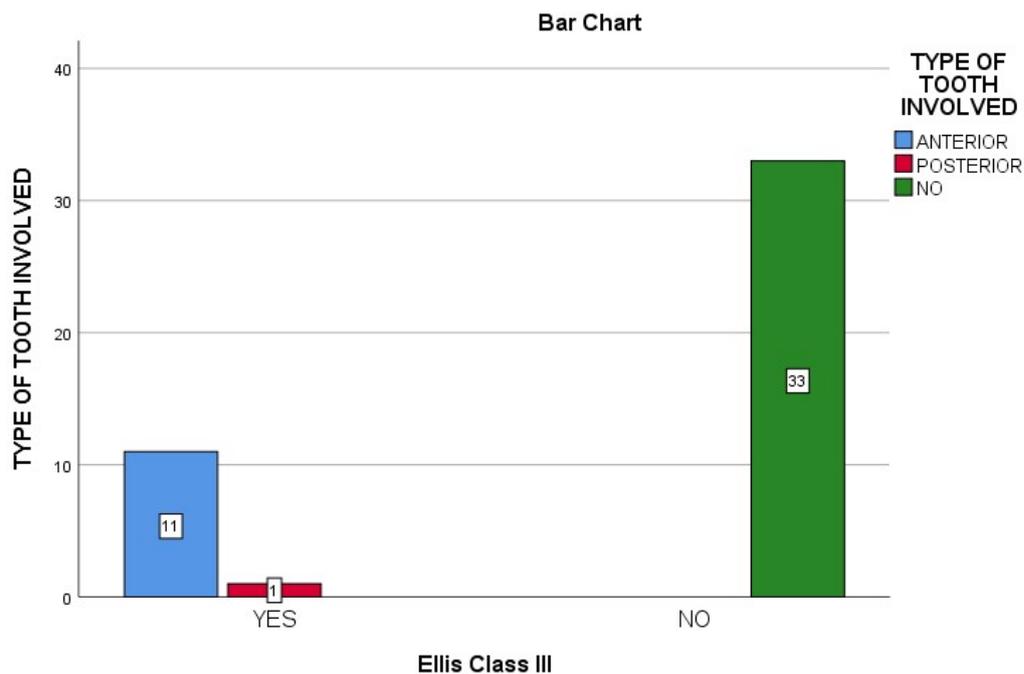
Graph 3: Bar graph showing the correlation between ellis class II and gender distribution. X axis represents patients with ellis class II. Y axis represents the gender distribution among patients with ellis class II [Males , females]. The frequency of ellis class II fracture occurring among males (blue) was greater as compared to females (red) and this difference was not statistically significant when assessed using chi square test [Chi square value - 0.474; P value = 0.491].



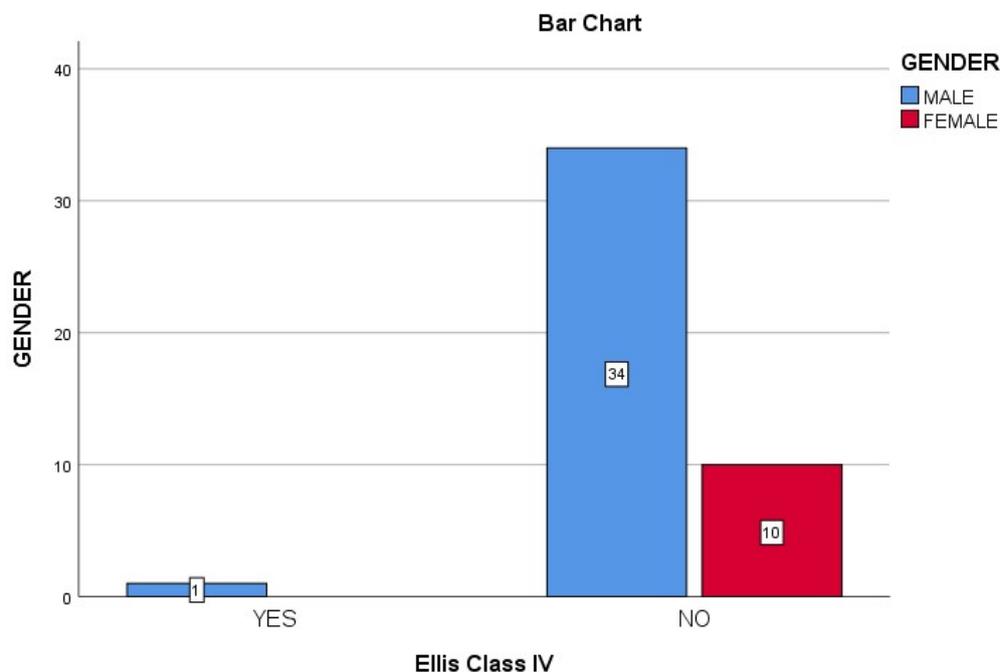
Graph 4: Bar graph showing the correlation between ellis class II and type of tooth involved among patients with ellis class II. X axis represents patients with ellis class II .Y axis represents the type of tooth involved among patients with ellis class II [anterior (blue),posterior (red), no tooth involved (green)]. The frequency of ellis class II fracture occurring in the anterior tooth region was greater as compared to posterior tooth and this difference was statistically significant when assessed using chi square test [Chi square value - 45.000; P value = 0.001].



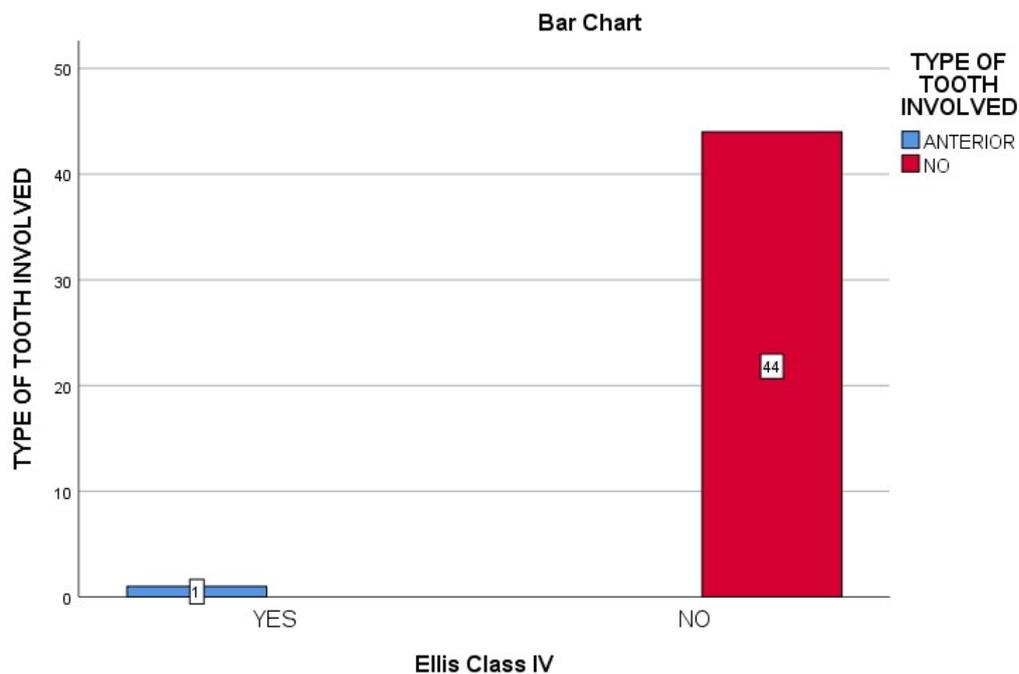
Graph 5: Bar graph showing the correlation between ellis class III and gender distribution. X axis represents patients with ellis class III .Y axis represents the gender distribution among patients with ellis class III [Males , females].The frequency of ellis class III fracture occurring among males (blue) was greater as compared to females (red) and this difference was not statistically significant when assessed using chi square test [Chi square value - 0.73; P value = 0.787].



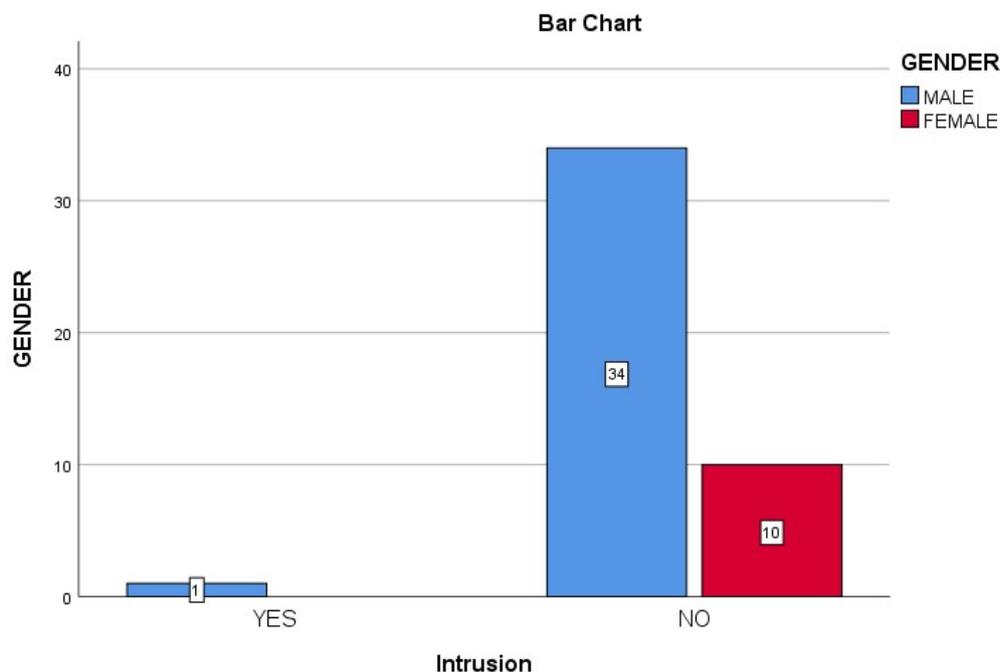
Graph 6: Bar graph showing the correlation between ellis class III and type of tooth involved among patients with ellis class III . X axis represents patients with ellis class III . Y axis represents the type of tooth involved among patients with ellis class III [anterior (blue),posterior (red), no tooth involved (green)]. The frequency of ellis class III fracture occurring in the anterior tooth region was greater as compared to posterior tooth and this difference was statistically significant when assessed using chi square test [Chi square value - 45.000; P value = 0.00001].



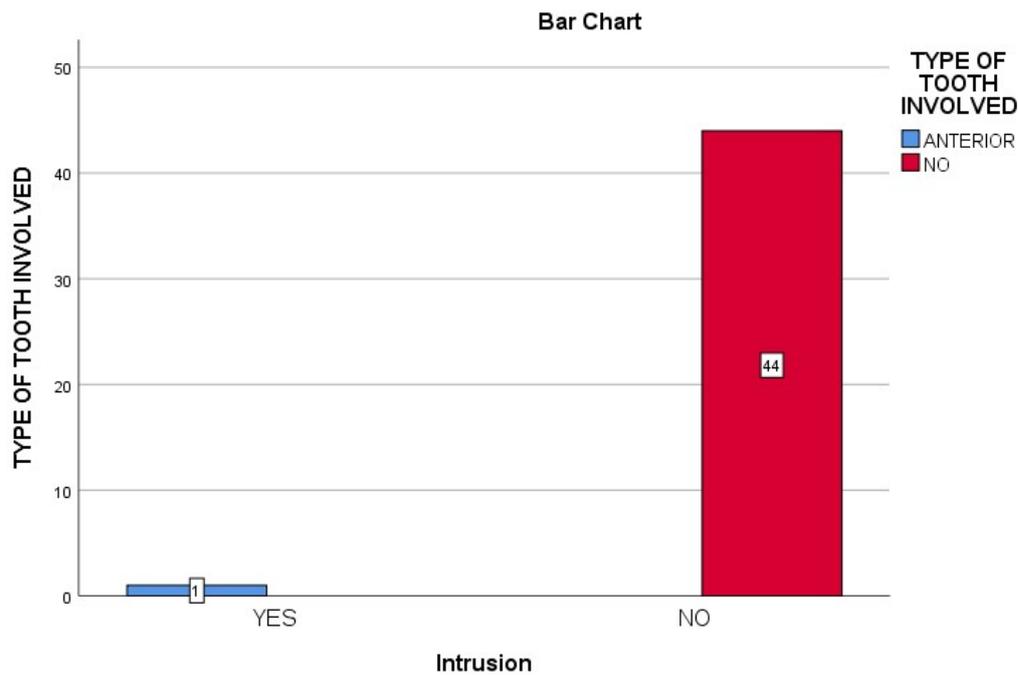
Graph 7: Bar graph showing the correlation between ellis class IV and gender distribution. X axis represents patients with Ellis class IV . Y axis represents the gender distribution among patients with ellis class IV [Males , females].The frequency of ellis class IV fracture occurring among males (blue) was greater as compared to females (red) and this difference was not statistically significant when assessed using chi square test [Chi square value - 0.292; P value = 0.589].



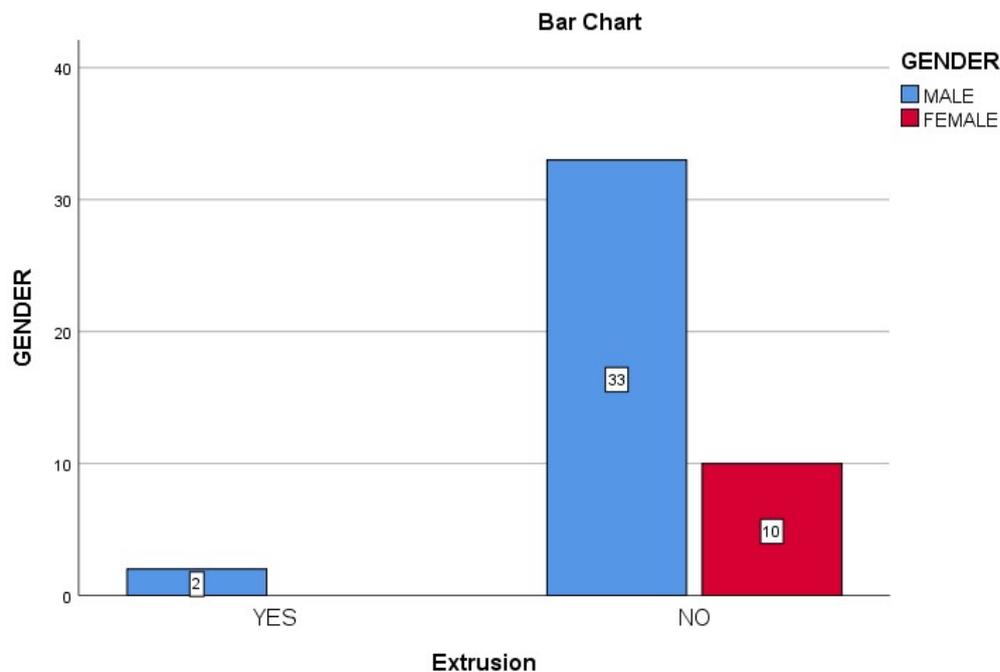
Graph 8 : Bar graph showing the correlation between ellis class IV and type of tooth involved among patients with ellis class IV. X axis represents Ellis class IV .Y axis represents the type of tooth involved among patients with ellis class IV [anterior (blue),posterior (red), no tooth involved (green)]. The frequency of ellis class IV fracture occurring in the anterior tooth region was greater as compared to posterior tooth and this difference was statistically significant when assessed using chi square test [Chi square value - 45.000; P value = 0.001].



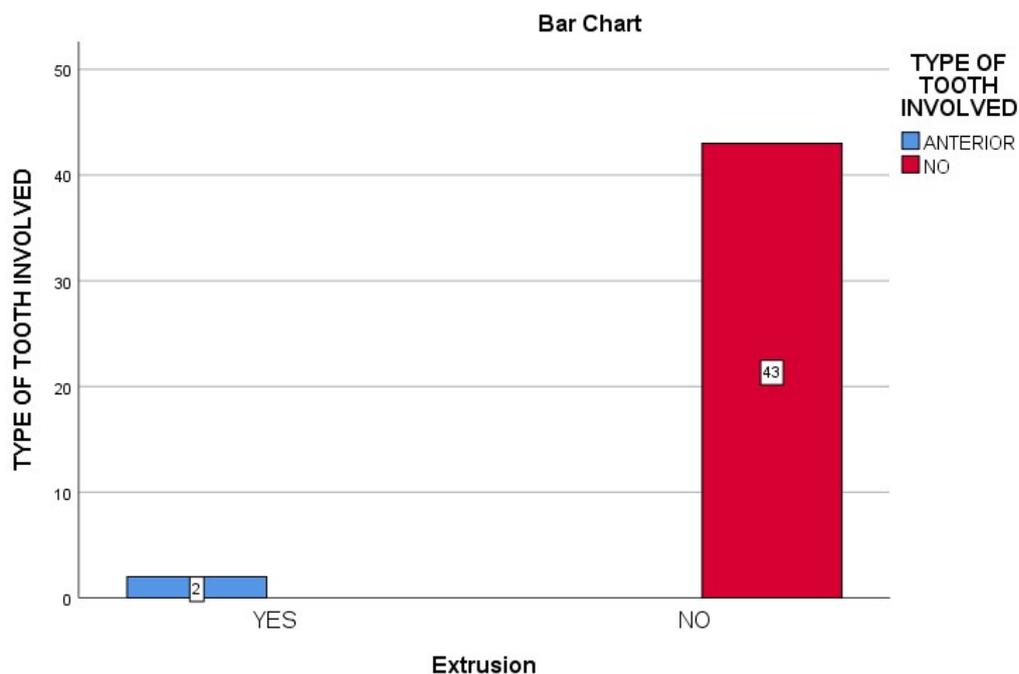
Graph 9: Bar graph showing the correlation between intrusion and gender distribution. X axis represents patients with intrusion.Y axis represents the gender distribution among patients with intrusion [Males , females].The frequency of intrusion occurring among males (blue) was greater as compared to females (red) and this difference was not significant when assessed using chi square test [Chi square value - 0.292; P value = 0.589].



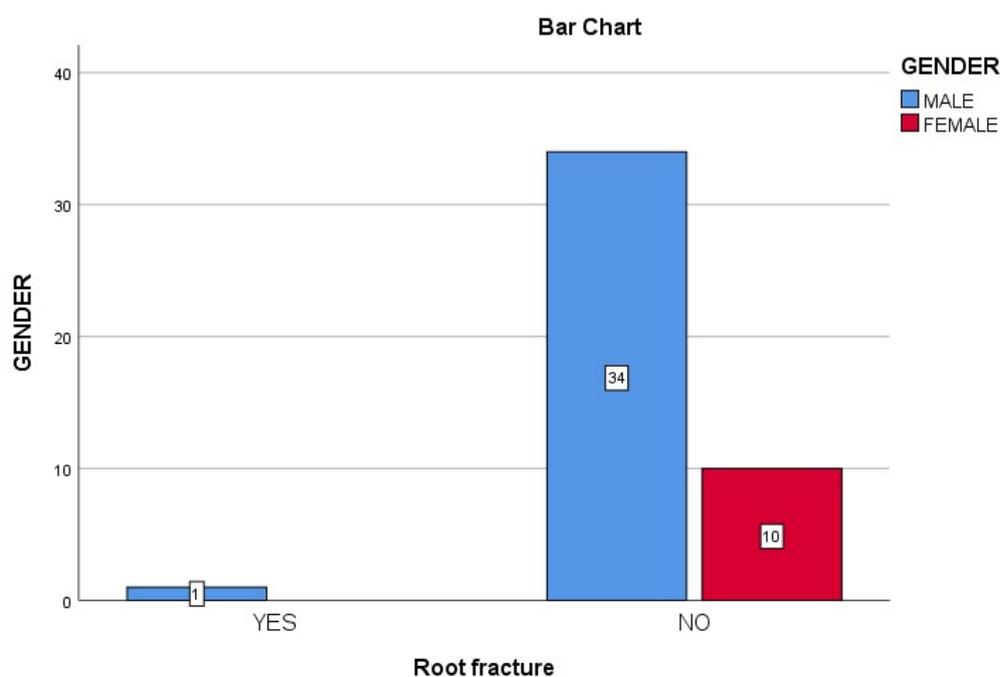
Graph 10 : Bar graph showing the correlation between intrusion and type of tooth involved among patients with intrusion. X axis represents patients with intrusion .Y axis represents the type of tooth involved among patients with intrusion [anterior (blue) ,posterior (red), no tooth involved (green)].The frequency of intrusion occurring in the anterior tooth region was greater as compared to posterior tooth and this difference was significant when assessed using chi square test [Chi square value - 45.000; P value = 0.001].



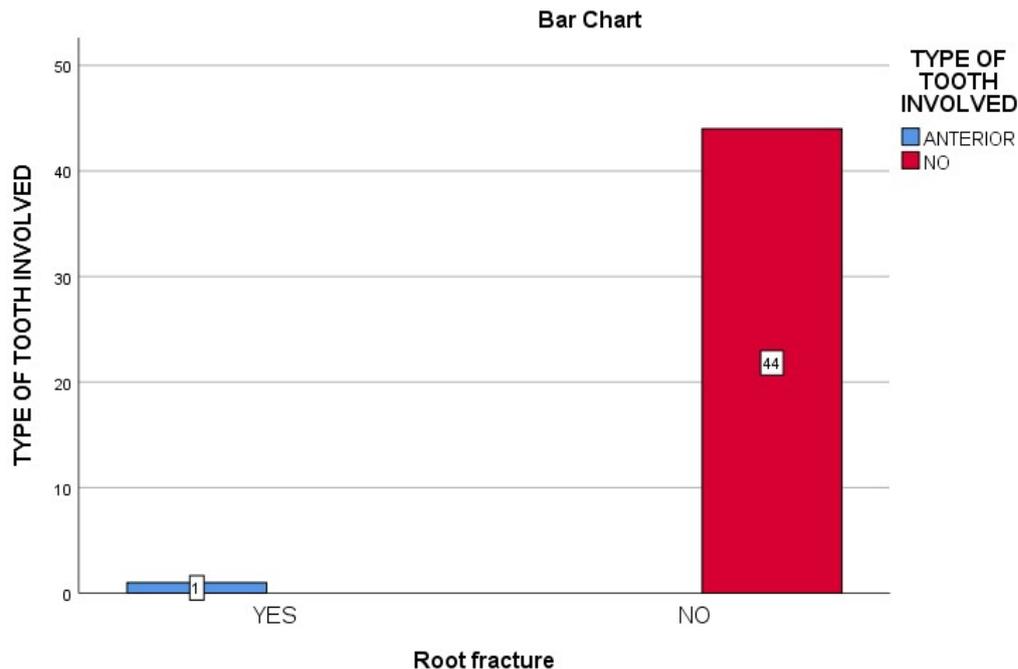
Graph 11: Bar graph showing the correlation between extrusion and gender distribution. X axis represents patients with extrusion. Y axis represents the gender distribution among patients with extrusion [Males , females]. The frequency of extrusion occurring among males (blue) was greater as compared to females (red) and this difference was not significant when assessed using chi square test [Chi square value - 0.598; P value = 0.439].



Graph 12 : Bar graph showing the correlation between extrusion and type of tooth involved among patients with extrusion. X axis represents patients with extrusion .Y axis represents the type of tooth involved among patients with extrusion [anterior (blue) ,posterior (red), no tooth involved (green)]. The frequency of extrusion occurring in the anterior tooth region was greater as compared to posterior tooth and this difference was significant when assessed using chi square test [Chi square value - 45.000; P value = 0.001].



Graph 13 : Bar graph showing the correlation between root fracture and gender distribution. X axis represents patients with root fracture.Y axis represents the gender distribution among patients with root fracture [Males , females].The frequency of root fracture occurring among males (blue) was greater as compared to females (red) and this difference was not significant when assessed using chi square test [Chi square value - 0.292; P value = 0.589].



Graph 14: Bar graph showing the correlation between root fracture and type of tooth involved among patients with root fracture. X axis represents patients with root fracture .Y axis represents the type of tooth involved among patients with root fracture [anterior (blue) ,posterior (red), no tooth involved (green)]. The frequency of extrusion occurring in the anterior tooth region was greater as compared to posterior tooth and this difference was not significant when assessed using chi square test [Chi square value - 45.000; P value = 0.001].

CONCLUSION

From the present study, it can be concluded that the prevalence of TDI among 8 to 17 years old children treated in Saveetha Dental College was found to be 5.1%. The study observed TDI among children in both mixed and permanent dentition periods as they are considered as the population at risk. Awareness programmes based on the prevalence of TDI among teachers, parents and children are required to create awareness towards TDI. Prevention through various health promotions and elimination of predisposing risk factors should be carried out to minimize the prevalence of traumatic dental injury among school children.

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