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Research Article

Prevalence Of Anterior Teeth Fracture Among 3 - 18 Year Old Pediatric Patients Visiting A Dental College

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ABSTRACT

Trauma to the teeth is a common reason for emergency room visits among children, with the maxillary anterior teeth being mostly affected. The majority of dental injuries involving the anterior teeth result from simple falls, accidents, sports activities or childish pranks. The aim of this study was to assess the prevalence of anterior teeth fracture among pediatric patients visiting a private dental college. A retrospective hospital based study was conducted by evaluating and analysing 5606 pediatric patient case records who had undergone treatment at Saveetha dental college and Hospitals from June 2019 - March 2020. Data such as patient age, gender, prevalence of anterior teeth fracture, tooth no. and type of anterior teeth fracture based on Ellis classification were documented. Descriptive and inferential statistics was done using IBM SPSS software. The results of this study conclude that the most common tooth involved in anterior teeth trauma was central incisors. The most prevalent type of anterior teeth fracture was Ellis class 2, followed by Ellis class 1 and Ellis class 3. There was a significant association between age, gender and anterior teeth fracture (p=0.000), with a higher prevalence among children aged between 9 to 11 years and male children.

Keywords : Anterior teeth fracture; Pediatric patients; Prevalence; Trauma

INTRODUCTION

Dental trauma is a significant problem in young people and the incidence of trauma exceeds that of dental caries and periodontal disease[(1)]. Among the earliest causes of traumatic dental injuries (TDI) are increased overjet with protrusion and inadequate lip coverage. These oral injuries can cause irreparable dental loss, not only at the time of accident, but also during the post-treatment period [(2)]. It has been reported that the majority of dental injuries involve the anterior teeth[(3)].

There is perhaps no single disturbance that has greater psychological impact on both the parents and children than the loss or fracture of a child's anterior teeth. This is especially so if the injury affects the permanent dentition and involves the loss of extensive tooth structure[(4)]. Traumatic dental injuries (TDI) involving the anterior teeth may not only lead to restriction in biting, phonetics and aesthetics, but may have an impact on a child's personality and quality of life[(5)]. The majority of dental injuries involving the anterior teeth result from simple falls, accidents, sports activities or childish pranks, which were not intended to harm[(6)].

Trauma that affects the hard tissue of the teeth causes pulpal and periodontal lesions, which are of great relevance to current dental practice[(7)]. The magnitude of this problem is substantiated by statistical data which indicates that 6% to 34% of individuals suffer fromTDI during childhood or adolescence[(8)]. These figures are distressing but not surprising considering the intensity and type of traffic and sports activities seen in many countries. Moreover, an increase in recorded violence explains why dental injuries are on the rise and, to a certain extent, out of control[(9)].

Despite being a worldwide major public health problem, most studies on the epidemiology of traumatic dental injuries do not provide sufficient details of the causes of TDI to prioritise which factors should be addressed[(10),(11)].

The overall prevalence of traumatic dental injuries of permanent anterior teeth in Rohtak was observed to be 16.1%. A significant gender influence on the occurrence of trauma was observed with more boys (18.4%) than girls (13.6%)[(12)].

The idea for the present study stemmed from the current interest in our community.Previously our team has a rich experience in working on various research projects across multiple disciplines The (13–15)(16–27). The aim of this retrospective epidemiological study was to assess the prevalence of anterior teeth fracture among pediatric patients visiting a private dental college.

MATERIALS AND METHODS

A retrospective hospital based study was conducted by evaluating and analysing 5606 pediatric patient case records who had undergone treatment at Saveetha dental college and Hospitals from June 2019 - March 2020. Data such as patient age, gender, prevalence of anterior teeth fracture, tooth no. and type of anterior teeth fracture based on Ellis classification were documented. The data collected were cross verified with intraoral radiographs. Ethical clearance was obtained from the Institutional Ethics Committee of the University under the approval number SDC/SIHEC/2020/DIASDATA/0619-0320. The data was reviewed and subjected to statistical analysis using IBM SPSS software version 20.0. Descriptive statistics and chi square test were applied with the level of significance set at $p<0.05$.

RESULTS

Figure 1 denotes age wise distribution of study population, both male and female population was relatively equal. Central incisors were the most common anterior teeth fractured (92.31%), followed by lateral incisors (6.92%) and canines (0.77%) [Figure 2].

Ellis class II was the most common type of anterior teeth fracture (43.59%), followed by Ellis I (43.59%) and Ellis III(29.23%) [Figure 3].

The prevalence of anterior teeth fracture was commonly observed among children between 9 to 11 years of age(3.1%). Chi square test showed that there was a significant association between age and the prevalence of anterior teeth fracture ($p<0.05$ [Figure 4].

Males had a higher prevalence of anterior teeth fracture(4.58%), particularly Ellis 2 fracture compared to females. Chi square test showed that there was a significant association between gender and the prevalence of anterior teeth fracture ($p<0.05$) [Figure 5].

DISCUSSION

The data for this retrospective study was based on residents of Chennai seeking treatment at a private dental college, Chennai. Very few studies investigate the prevalence of anterior teeth fracture among children in the South Indian population.

The results of this study show that the overall prevalence of anterior teeth fracture among pediatric patients was 6.96%. The prevalence was found to be higher as compared to the earlier studies done by Nick Hussein (4.1%) in Malaysian population[(28)] but lower than a study by Gauba -7.54%[(29)]. A study by Ravishankar et al showed that the prevalence of TDI to anterior permanent teeth was 15.1% in 12-year-old school children in South India[(30)]. The proportion of damage to teeth in the population was lesser than 13.8% reported in the study by Gupta et al[(31)] and the 14.9% reported in a study conducted on NCC cadets in South India[(32)]. TDI in various epidemiological studies differs considerably, ranging from 6% to 34% depending upon the trauma classification, the dentition, and the geographical and behavioural differences between study locations and countries[(33)].

In the present study, the prevalence of anterior teeth trauma was higher among males compared to females children. This finding was in accordance with previous studies by Soriano et al[(34)], Kaste LM et al[(35)] and Stockwell AJ[(36)], which show that males had a higher incidence of anterior dental trauma when compared to females. The higher percentage of traumatic injuries in the male children could be attributed to the fact that male children engage in leisure activities or sports of a generally more aggressive nature or with a greater accident risk than the female children do.

This study concluded that the maxillary central incisors were the most common teeth affected by trauma. This is comparable to a study by Patel MC et al, which showed that the majority of injuries occurred in the maxillary central followed by maxillary lateral incisors[(37)]. Also a study by Petti et al, in Italian school children population showed similar results[(38)]. This could be due to early eruption of maxillary central incisors and thus are at risk for a longer period of time. Injury to maxillary incisors is more frequent than mandibular incisors because blows to mandibular teeth are dissipated due to nonrigid connection of mandible to the cranial base.

Enamel-dentin fracture (Ellis class 2) , was the most commonly reported type of fracture in the present study. Wilson et al, also reported enamel-dentin fracture to be the most prevalent[(39)]. Rocha et al also concluded that enamel-dentin fracture accounts for 51.4% of the total traumatized teeth[(40)]. The type of fracture in this study showed some differences with other studies which concluded that enamel fracture is more common than enamel-dentin fracture[(41),(42)]. This may be due to the different criteria used and also the location where the study was conducted, i.e. in the hospital or in the field.

The age at which children are most prone to traumatic injuries should be identified so that preventive measures can be directed to protect the risk population to a considerable extent. In this study, the peak age to sustain injury was found to be 9 to 11 years in both boys and girls. This is similar to a survey by Patel MC et al, which identified that children between 8-10 years of age were more prone to traumatic injuries to anterior teeth[(37)]. A study by Rocha et al stated that the occurrence of trauma was higher in children between 8 and 9 years of age[(40)]. This may be due to the fact that during this age, maximum physiologic maxillary growth takes place and this age group exhibits an increased period of outdoor and reckless activities which increase the liability to injury.

The results of this study have to be interpreted with the geographic limitation of the study population and the sample size selected. Hence it cannot be generalized to other pediatric populations of geographic and cultural variation.Our institution is passionate about high quality evidence based research and has excelled in various fields ((43–53)

CONCLUSION

Dental fractures must receive special attention since they may disturb the affected children's mastication and phonetics as well as adversely affecting the physical appearance and committing the patient to lifelong dental maintenance.Within the limits of this study, there was a significant association between age, gender and anterior teeth fracture, with a higher prevalence of Ellis class 2 fracture among 9 to 11 years and male children. Dental injuries are preventable and preventive and promotive programmers should be encouraged to reduce the prevalence of dental injuries in children. Public Health Education regarding the epidemiology of dental injuries and its prevention through health promotion may play a major role in reducing the prevalence of traumatic dental injury and avoiding the cost of treatment in developing countries.

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Nil

AUTHORS CONTRIBUTION

All authors contributed to the design and implementation of the research, analysis of the results, analysis of the results and to the writing of the manuscript.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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GRAPHS

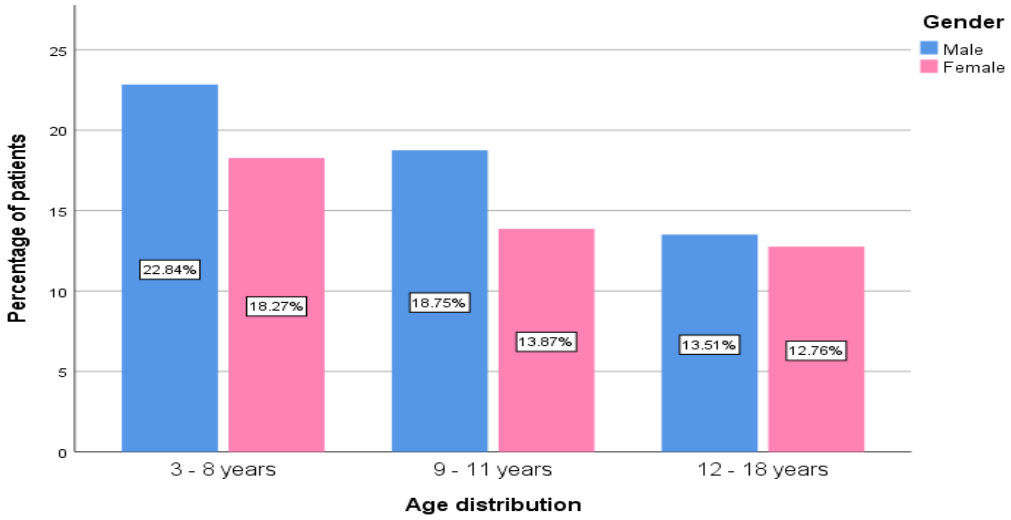

Figure 1 : Bar graph representing the distribution of gender among various age groups. X axis represents the age and Y axis represents the number of male and female patients included in this study. Among the study population, male patients are relatively more in all age groups.

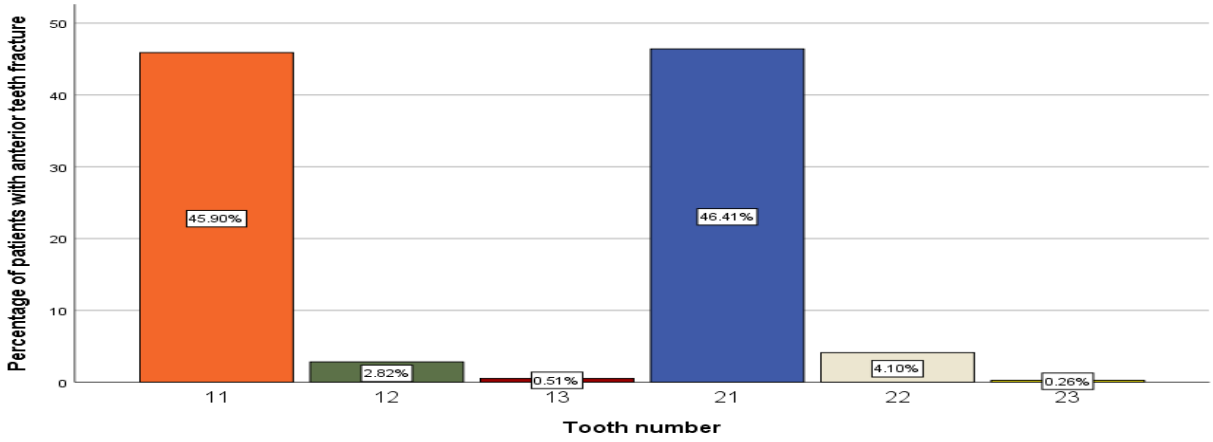

Figure 2 : Bar graph representing the prevalence of anterior tooth fracture among Maxillary and mandibular anterior teeth. X axis represents the tooth number and Y axis represents the percentage of patients with anterior teeth fracture. In the Maxillary arch the left Central Incisor (46.4%) was most commonly fractured compared to the right Central Incisor (45.9%).

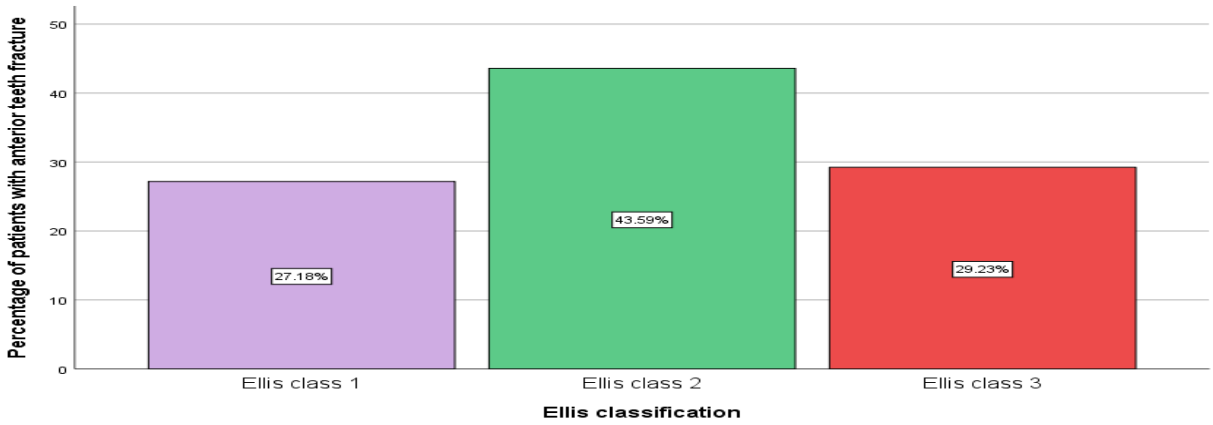

Figure 3 : Bar graph represents the Ellis classification of anterior teeth trauma. X axis represents the Ellis classification and Y axis represents the percentage of patients with anterior teeth fracture. The most prevalent type of anterior teeth fracture was Ellis class II (43.59%), followed by Ellis class I (43.5%) and Ellis class III (29.2%).

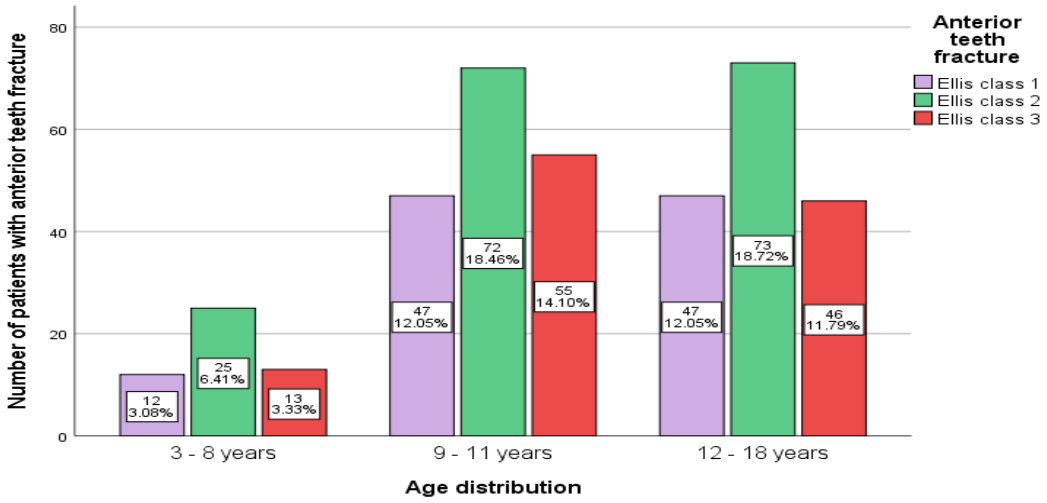

Figure 4 : Bar graph representing the association between age and anterior teeth fracture. X axis represents the age and Y axis represents the number of patients with anterior teeth fracture. There was a prevalence of anterior teeth fracture among children between 9 to 11 years of age. Chi square test showed that there was a significant association between age and the prevalence of anterior teeth fracture. Pearson chi square value = 142.350; p-value = 0.000 ($p<0.05$, *statistically significant).

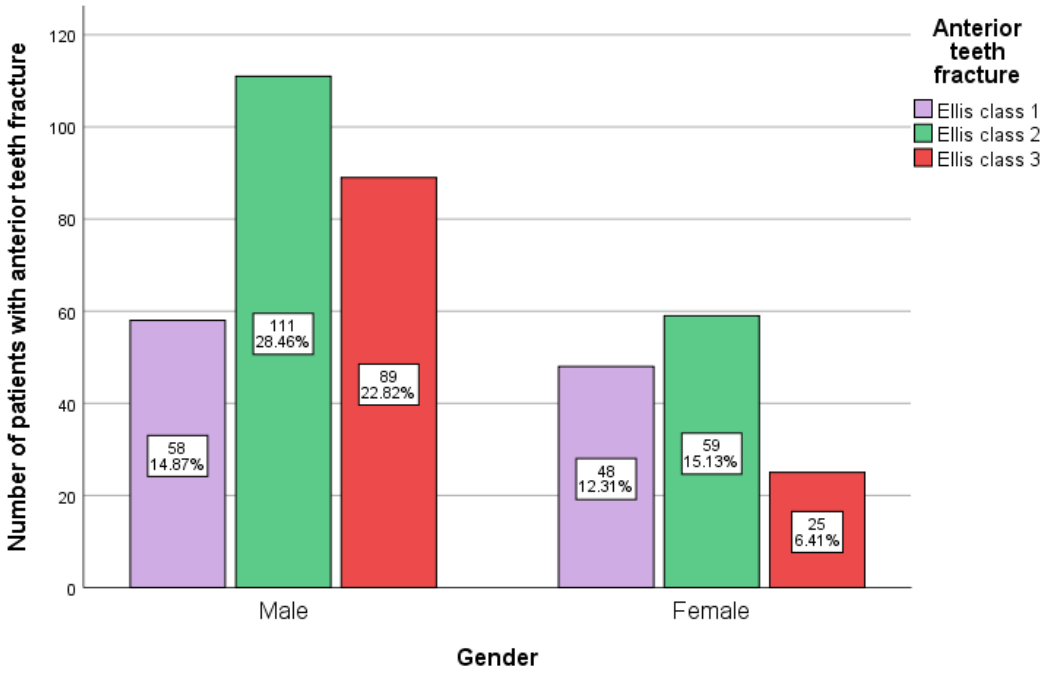

Figure 5 : Bar graph representing the association between gender and anterior teeth fracture. X axis represents the gender and Y axis represents the number of patients with anterior teeth fracture. Males had a higher prevalence of Ellis 2 fracture when compared to females. Chi square test showed that there was a significant association between gender and the prevalence of anterior teeth fracture. Pearson chi square value = 19.810; p-value = 0.000 ($p<0.05$, *statistically significant).