INJURIES TO TEETH AND SOFT TISSUE AMONG CHILDREN - AN UNIVERSITY BASED RETROSPECTIVE ANALYSIS

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ABSTRACT

Trauma to the oral region occurs frequently and comprises 5% of all injuries which is more prevalent among children. They are commonly observed problems in the primary and permanent teeth. Dental injury to primary teeth can result in complicated problems to the underlying permanent teeth such as hypoplasia, discoloration and delay in eruption time and tooth malformation. In addition to pain and possible infection, consequences of dental trauma include alteration in physical appearance, speech defects and emotional impacts, thus affecting the child’s quality of life. They have a strong impact on children’s and adolescent’s life quality as they cause physical and emotional distress, and in children they might have a high negative impact on the social relationships. This study aims to assess if there is a difference in prevalence of dental trauma causing injuries in a certain gender, age and type of dentition. A retrospective study was done among patients visiting the department of Pedodontics in a private dental hospital with the chief complaint of dental injury affecting both soft and hard tissue. Patients’ case records were accessed and data was collected, calculated and descriptive statistics was performed using SPSS software. Male participants (>60%) have a higher rate of incidence of dental injury and lip/labial mucosa being the most commonly injured soft tissue (p<0.05). Avulsion was the most common injury to primary teeth and Ellis class III fracture was the most reported injury to permanent teeth (p>0.05). Injuries in the age of 10 years were highly reported. Permanent teeth were more prone to dental injury.

Keywords: Dental trauma, Soft tissue injury, Fracture, Luxation, Avulsion

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INTRODUCTION

Oral health plays a critical role in a child’s wellbeing and their parents’ attitude and response towards their child’s dental health influences it.[1] Following dental caries, the most infectious disease in children, [2], dental trauma in children causes most significant damage to the teeth. Traumatic dental injuries frequently occur in children and those in young adults constitute 5% of all injuries that require treatment. The literature has shown that 3% to 80% of emergency dental treatments are because of tooth injuries and the incidence of dental trauma within one year is 0.4% in every age group and 1.3% to 4% in school age children. It has been reported that 25% of all school age children have had a dental injury as reported by Glendor et al. [3] Traumatic injuries occur mostly at 1 to 3 years in a primary dentition and 8 to 11 years in permanent dentition. [4–7] Among children less than 2 years of age, the major cause of dental injury is due to falls as their motor coordination is not yet fully developed or due to any toys or object contact to their intraoral and perioral region. In pre-school children, sports accidents, falling off bicycles and crashing may cause dental injury. [8]

Additionally, collisions, traffic accidents, home accidents and child abuse can also cause dental trauma. [9] Dental injuries can occur to teeth which can be classified using Ellis classification and can also occur to lips, chin, cheeks and gingiva. Facial trauma results in fracture displaced or lost teeth and can have significant negative functional, aesthetic and psychological effects on children. [10] The economic cost of treatment and its impact on oral health, related quality of life have made traumatic dental injuries a serious public dental health problem in children. [11] The maintenance of the primary dentition is important to guide the eruption of permanent teeth and traumatic dental injuries may affect this balance, and hence, it is considered as an important oral health problem. [12]

Furthermore, dental injury to primary teeth can result in complicated problems to the underlying permanent teeth such as hypoplasia, discoloration and delay in eruption time and tooth malformation. [13] In addition to pain and possible infection, consequences of dental trauma include alteration in physical appearance, speech defects and emotional impacts, thus affecting the child’s quality of life. [14, 15]

Most common risk factors for traumatic dental injuries include increase in overjet, inadequate lip coverage, Class II division 1 occlusal relationship according to studies. [16,17] The importance of assessing prevalence of traumatised teeth by the survey was pointed out by Andreasen and Andreasen in 1994. Epidemiological data provides a basis for evaluating the concepts of effective treatment, resource allocation and planning within any health environment. [18] Traumatic dental injuries to the primary dentition which occurs at ages 0 to 3 years are very important, because the mineralisation of the permanent incisors is still not fully completed until 3 years of age. [19]

Previously, we have worked on pedodontic rotary files [20,21], its comparison with hand files in regards to biomechanical preparation and obturation qualities [22–26], assessed fluoride levels in drinking water and its efficacy in toothpastes [27,28] assessed prevalence on frenal attachment types, [29] systemic reviews [30], assessed salivary malondialdehyde levels in children with ECC, [31] but no sufficient evidence on the epidemiology of dental trauma and its associated patterns. The objective of this retrospective study was to analyze the injuries. The knowledge about the prevalence of dental injuries to establish preventive strategies and to identify the treatment needs in a given population. This data would provide understanding of the associated risk factors and help for the comparison with the results of other studies conducted throughout the world. The aim of this study was to retrospectively analyse injuries to teeth and soft tissues in a university setting.

MATERIALS AND METHODS

A retrospective study was carried out in a university setting among patients visiting the dental hospital, a predominantly south Indian population was chosen for the study. Patients who visited the department of
Pedodontics, reporting with the chief complaint of dental injury to teeth or soft tissue were chosen for the study and their case records, preoperative photographs and radiographs were checked.

Selection of subjects:
   The case sheets of patients of below the age of 13 years who reported to the clinic with the chief complaint of dental injury like fractured tooth, luxation or avulsion injuries, lacerations to gingiva of lip were collected from the time period from June 2019 to March 2020.

Data collection:
   Records of the patients were obtained from the outpatient department of a private dental college. The advantage of this methodology was the ease of access and the limitations were that the sample was not large enough and the study was confined to a single metropolitan area. Approval for the study and permission to access patients’ records was obtained from the ethical review Board of Saveetha Institute of Medical and Technical Sciences with the approval number: SDC/SIHEC/2020/DIASDATA/0619-0320

Inclusion criteria:
   Children of ages 1 to 13 years who presented with a chief complaint of injury to primary or permanent teeth or soft tissue were included in the study.

Exclusion criteria:
   Children with psychological or mental disorders, with pre-existing medical conditions and ones with the cause of trauma being road traffic accidents were excluded from the study. Incomplete data was removed from the study due to possibility of bias.

Statistical analysis:
   The data was collected, tabulated using SPSS software (IBM SPSS Statistics 20.0), frequency distribution charts were made. The method of statistical analysis used in this study was the Chi-Square Test to compare two populations. The analysis was done for gender, age, type of dentition and type of injury.

RESULTS AND DISCUSSION

Among 90 patients, only 31.87% were females and 68.13% were males as depicted by Graph 1. Graph 2 depicts that most of the dental injuries in children occur most commonly during the age of 10 years among both male and females. Graph 3 shows a higher incidence of permanent teeth affected by dental injuries (85.7%). In primary dentition, crown fracture involving pulp was the most common dental injury among males (16.6%) and a high incidence of avulsion of tooth was reported among females (25%) as reported by Graph 4. However, in the permanent dentition, Ellis class III type of dental injury to teeth was the highly reported dental trauma among males (Graph 5). Injury to gingiva was observed most commonly in Ellis class III type of injury to permanent teeth. The highest number of soft tissue injuries were associated with Ellis class V or avulsion injuries and the lip/labial mucosa was the most commonly injured soft tissue. Graph 6 depicts a significant lack of association of soft tissue injuries and dental injuries to teeth as most of the tooth injuries were not simultaneously associated with injury to soft tissue (p<0.05). 17% of the cases reported with injury, laceration to lip or labial mucosa followed by injury to gingiva. However, 70% of the cases reported with no injury to soft tissue. Injury to soft tissue was commonly reported among male children (p>0.05).
Although traumatic dental injuries can occur at any time in our lives, children and adolescents are exposed to these injuries more frequently. Young children are more commonly affected by traumatic injuries of the primary teeth. Particularly, in the anterior teeth the injuries can adversely affect the development of the underlying tooth germ [5].

In our study done, more than 50% of the patients reporting to the dental clinic with dental injuries were boys (Graph 1). This was supported by other studies done by Singh N et al and Kurt A et al who conducted their studies in India and Turkey respectively [9,32]. This can be attributed to the fact that after the age of 3 to 5 years, boys have more affinity towards sporting activities than girls and thus the increased risk of dental injuries due to falls and accidents. Girls are less prone to traumatic dental injuries as our social set up and cultural reservations do not encourage them to be involved in vigorous outdoor activities. Regarding the age of the patients, higher incidence of dental trauma in children was observed in patients of age 10 years (Graph 2). This was supported by a study done by who stated that The highest frequency of dental injury was in the 10–12-year-old participants and lowest frequency was in 3–6-year-old children. [33]

Similarly, it is observed in our study, permanent dentition was more affected by dental trauma than the primary dentition (Graph 3). This was supported by the study done by Sari M E et al (2014) in Turkey [34] who suggested that this may be due to the fact that children in the primary dentition period spend more time under parental control whereas during their transition to a permanent dentition period they tend to socialise with children of their age, become aware of their bodies and abilities and indulge in sporting activities which can lead to a higher risk of traumatic dental injury. This was contradicted by Otuyemi O D et al [35] who stated that children between ages 2 to 6 years were more prone to dental injuries.

It can be seen from Graph 4 that overall, avulsion was the most commonly reported dental injury in primary teeth and a supporting finding was reported by Sari ME et al [34]. The most common tooth injury in males was reported to be crown fracture involving pulp whereas in females, avulsion was the most reported dental injury. This coincided with our findings regarding permanent teeth. The most common tooth injury based on Ellis classification (permanent teeth) is Ellis class III, which is the fracture of enamel and dentin exposing pulp whereas among females, Class V - avulsion is the most reported dental injury (Graph 5). This was contradicted by Vuletic M et al (2014) who stated that Ellis class II type of dental injury was the most common. [36]

Regarding an association between soft tissue injury and injury to permanent teeth as shown by Graph 6, it can be observed that soft tissue injury is most common in Ellis class V fractures. There were no supporting or contradicting studies for this finding. However, this can be explained by the fact that avulsion - complete dislodgement of tooth from its socket- inevitably injures surrounding tissues thus causing labial mucosa and/or gingival lacerations.

Males were more prone to soft tissue injury wherein the lip or labial mucosa was the most affected soft tissue among both males and females (Graph 7). And this finding coincided with studies from Croatia. [36] This can be explained by the fact that due to increased overjet or class II division 1 malocclusion, there is inadequate lip closure due to which it is the first site to come into contact along with the incisors during a fall.

The limitations of this study are its small sample size and that it covers only one metropolitan area. Further studies are required to shed more light on the aetiological components which will aid in prevention and efficient treatment planning.
Manohar et al (2020): A retrospective study to assess injuries to primary and permanent teeth and soft tissue among children

Graph 1: Bar graph representing gender-wise frequency distribution of dental trauma. X axis denotes the gender of the patients reporting to the clinic with the chief complaint of dental injury and Y axis represents the number of patients in each category. Higher prevalence of dental injury was observed among males (68.3%).
Graph 2: Bar graph representing age-wise frequency distribution of dental trauma. X axis denotes the age of the patients reporting to the clinic with the chief complaint of dental injury and Y axis represents the number of patients in each category. Dental injuries in children occur most commonly during the age of 10 years among both male and females.
Graph 3: Bar graph representing frequency distribution of dental trauma based on the type of dentition. X axis denotes the type of dentition affected by dental injury and Y axis represents the number of patients in each category. Prevalence of dental injury to permanent dentition is higher than injury to primary dentition.
Graph 4: Bar graph representing association of injury to primary teeth and gender. X axis denotes the type of injury to primary teeth and Y axis represents the number of patients in each category. Chi-Square test, p value: 0.464 (>0.05), hence statistically non-significant. Among males (blue), crown fracture involving pulp was the most common dental injury whereas among females (green), avulsion was the highest reported dental injury in primary dentition.
Graph 5: Bar graph representing association of injury to permanent teeth based on Ellis classification and gender. X axis denotes the type of injury to permanent teeth based on Ellis classification and Y axis represents the number of patients in each category. Chi-Square test, p value: 0.283 (>0.05), hence statistically non-significant. Ellis class III type of dental injury to teeth was the highly reported dental injury among males (blue) followed by Ellis class II and among females (green), Ellis class II, III and class V were reported in equal number in case of permanent dentition.
Graph 6: Bar graph representing association of occurrence of soft tissue injury and type of injury to permanent teeth (Ellis classification). X axis denotes the type of injury to permanent teeth based on Ellis classification and Y axis represents the number of patients in each category. Chi-Square test, p value: 0.001 (<0.05), hence statistically significant. Among permanent teeth, injury to lip or labial mucosa (green) was highly reported in Ellis class V cases followed by Ellis class III and injury to gingiva (blue) was seen most commonly in Ellis class III cases. In most cases, there was no soft tissue injured (yellow) with injury to teeth.
CONCLUSION

Within the limitations of our study, we found that male participants have a higher rate of incidence to dental injury (68.13%). Avulsion was the most common injury to primary teeth (33.3%) and Ellis class III fracture (35.8%) was the most reported injury to permanent teeth. Lip/labial mucosa (17%) was reported as the most commonly injured soft tissue. Significantly, higher prevalence of injury to permanent dentition was noted (85.7%).

REFERENCES


