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Reason for Visiting the Dentist Following Injury to Permanent Teeth among 12-17 Year Old-A Retrospective Study

Running Title : Visit to dentist following trauma to permanent teeth

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Abstract:
Traumatic injuries to permanent teeth in Pediatric patients must occur in the maxillary anterior tooth region and is one of the most common causes of visit to the dentist in emergency situations. Visiting the dentist following any trauma to the permanent teeth is of at most importance and their early management will help in managing any serious problems that may occur if left untreated. The retrospective study was conducted among patients who visited an institution in Chennai. The patients records were reviewed and the data of patients who visited between June 2019 to March 2020 were analysed. 2030 Pediatric patients who visited the dentist following traumatic injury to permanent teeth were included in the study. Retrospective analysis was done based on the collected data. Statistical analysis was performed in SPSS Software, data was analysed by descriptive and inferential statistics. 41.7% of patients reported with a chief complaint of fractured teeth. Males were most affected by traumatic injury (70.6%). The 12-17 years age group was most affected in the maxillary anterior region (55.90%). From this study we were able to conclude that fractured teeth was the most common chief complaint among patients reporting with traumatic injury and they complained of aesthetics being the most common concern. 12-17 years was the common age group affected by traumatic injury and the most component region to be affected was the maxillary anterior region. Males were most commonly associated with traumatic injuries then when compared to females. Patients with fractured teeth were the most common chief complaint and they visited the dentist within 1 year of the injury. It was seen that patients with ellis class 3 fracture was the most common traumatic injury and they visited the dentist within 1 year of the injury.

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INTRODUCTION

Traumatic dental injury over the years has seen to be one of the most common disorders in children. Traumatic injury is due to an external impact on the mineralised and supporting tooth tissues. The severity ranges and differs according to the type and extent of the injury, it may involve the enamel, dentin, pulp, periodontal ligament or the bone. Dental injuries are the most common and are seen in as many as 92% of all patients seeking consultation or treatment for injuries to the oral region (Ferreira et al., 2009). The International Association of Dental Traumatology reports that one of every two children sustains a dental injury, most often between the ages of 8 and 12 years. Traumatic dental injuries tend to occur at childhood or a young age during which growth and development take place, 17% of all bodily injuries (Ak et al., 2019; Govindaraju et al., 2017b, 2017c; JeevananDan, 2017; Jeevanandan and Govindaraju, 2018; Somasundaram et al., 2015).

Traumatic injuries in permanent teeth have been reported to have a prevalence rate between 6.1% to 58.6% (Oldin et al., 2015; Pattussi et al., 2001). Traumatic injuries in permanent teeth are of automated importance to be treated and managed as early as possible. Traumatic injuries to the face and mouth affects dental health and it may lead to aesthetic, psychological problems and it causes pain and functional implications (Flores, 2016; Noori et al., 2015). In children TDI are more common than the presence of dental caries , this is due to the fact that children are more prone to falls, collisions with people or inanimate objects, traffic accidents, sports and violence (Christabel and Gurunathan, 2015; Govindaraju et al., 2017a; Gutiérrez et al., 2017;

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Packiri et al., 2017; Panchal et al., 2019; Pattussi et al., 2001; Ravikumar et al., 2017).

The majority of dental injuries involve the anterior teeth, It has been reported that anterior teeth, especially the maxillary central and lateral incisors are predominantly affected by traumatic dental injuries for both primary and permanent dentitions. Traumatic dental injuries generally affect a single tooth except certain trauma events, such as traffic accidents, violence, and sports injuries, which result in multiple tooth damage. which may lead to restriction in biting, difficulty in speaking clearly, and feeling embarrassed to show the teeth. There is agreement that traumatic injuries occur more often to the maxillary than the mandibular incisors and that the central incisors are affected more than the lateral incisors (Cavalcanti et al., 2009). Trauma to anterior teeth in the Asia-Pacific region ranged from 6% to 19% (DEARING and SG, 1984). The permanent incisors are the most important in terms of both aesthetically and functionally and any trauma to this may lead to physical and physiological effect on the child as the child will be unable to smile and tends to avoid it due to fractured incisors .(GovinDaraju and Gurunathan, 2017; Gurunathan and Shanmugavel, 2016; Nair et al., 2018; Ramakrishnan and Shukri, 2018; Subramanyam et al., 2019)

Vast number of traumatic injuries affect the permanent dentition , They were mainly classified by the following author: (Andersson, 2013; Andersson et al., 2012; Andersson and Andreasen, 2011; Andreasen, 1970)

Crown fractures are the most commonly reported traumatic dental injury to the permanent teeth. This is also the most important injury and this may cause aesthetic problems to the patient and in cases where the fracture is deep it may lead to pain. Proper diagnosis , treatment planning and follow up is important to assure favourable outcome . Immature permanent tooth is not fully formed, particularly the root apex. A vital pulp is necessary for the development and maturation of the tooth root (Koch et al., 2017). Completion of the root development of the teeth and closure of the root apex takes place 2–3 years after the eruption of the teeth. If pulp necrosis occurs before complete root development, the root development undergoes a standstill, so the root remains without closure. In such cases, root canal treatment is both inevitable and difficult to treat (Koch et al., 2017; Patil et al., 2014).

In any traumatic dental injury , effort must be taken to preserve the permanent teeth and its vitality as much as possible this is to ensure complete root development. A vast majority of TDIs to permanent teeth occur in children and teenagers and this may have lifetime consequences if left untreated .Patient compliance with follow up visits and home care contributes to better healing following many traumatic dental injuries . Both the patient and parents of young children should be advised to take proper care for the healing of immature permanent teeth. Prevention of further injury is by avoidance of participation in any contact sports and by meticulous oral hygiene .

In this study we Aim to identify the prevalence of dental trauma, age of occurrence, gender, type of injury, most affected teeth by traumatic injury in the permanent dentition, clinical signs and symptoms, and cause of trauma.

MATERIALS AND METHODS

Study Setting

The study was conducted with the approval of the Institutional Ethics Committee [SDC/SIHEC/2020/DIASDATA/0619-0320]. The study consisted of one reviewer, one assessor and one guide .

Study Design

It was a Retrospective study. The study was designed to include all dental patients of ages between 6-17 years reporting with traumatic injury to their

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permanent teeth were included in the study. The patients who did not fall into this inclusion criteria were excluded.

Sampling Technique

The study was based on a non probability consecutive sampling method. To minimise sampling bias, all case sheets of patients who underwent treatment in their mandibular third molar were reviewed and included. The internal validity of the study was strict inclusion and exclusion criteria, the external validity of the study was generalised to the Chennai population.

Data Collection and Tabulation

Data Collection was done using the patient database with the timeframe work 01 June 2019 and 31 march 2020. About 42,000 case sheets were reviewed and those fitting under the inclusion criteria were included. Cross verification was done with the help of Photographs and radiographic evidence. The inclusion criteria was to include all patients of ages 12-17 years reporting with traumatic dental injury To minimize sampling bias all data were included. The exclusion criteria was patients with systemic illness. Data was downloaded from DIAS and imported to Excel, Tabulation was done. The values were tabulated and analysed. The traumatic injuries were evaluated and classified with the help of Andersson classification of traumatic injuries:

Classification of traumatic injury :

Types of Dental injury on hard tissue

1. Enamel fracture
2. Enamel-dentin fracture
3. Enamel-dentin-pulp fracture

Types of dental injury to periodontal tissue

1. Concussion
2. Subluxation
3. Intrusive luxation
4. Extrusive luxation
5. Lateral luxation
6. Avulsion

Types of dental trauma on supporting bone

1. Alveolar socket wall fracture
2. Alveolar process fracture
3. Mandible or maxilla fracture.

Types of dental trauma on gingival or oral mucosa

1. Gingival or oral mucosal laceration
2. Gingival or oral mucosal contusion
3. Gingival or oral mucosal abrasion

Statistical Analysis

Descriptive statistics were performed using SPSS by IBM on the tabulated values. Chi-Square test was performed and the p value was determined to evaluate the significance of the variables it was used to evaluate the association between the age,gender,when they visited the dentist following the traumatic injury and their chief complaint with their visit to the dentist following a traumatic injury. The results were obtained in the form of graphs and tables.

RESULTS AND DISCUSSION

It was seen from our study out of 163 patients, 41.7% of the patients reported with Fractured tooth , and they reported with aesthetics being the main complaint , 30.1% of the patients reported with severe pain following a dental injury . It was noted from this that patients with severe pain reported to the dentist immediately following a dental trauma or within a week while patients with fracture teeth visited over a wide range of time as noted . This could be attributed to severe pain that is unbearable and they needed immediate relief. While aesthetics bring a factor based on the patients perception , they chose to ignore it till it concerned them.

Based on age wide distribution we were able to see that the 12-17 years age group was more prone to

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traumatic dental injury . Based on the literature we were able to notice that Age is an important factor, as school children and adolescents are the main groups who are mostly prone to traumatic injuries. It is estimated that 71–92% of all traumatic dental injuries occur before the age of 19 years; other studies have reported a decrease after the age of 24–30 years. We were able to notice that Olmert the older the children were, the more people they were prone to dental injury . This was seen similarly to other articles published by (Ferreira et al., 2009).

To study the most commonly injured tooth in dental trauma it was noticed that the maxillary anterior region was the most commonly affected region in traumatic injury . In a study conducted by Shilpa , she observed that maxillary central incisors are the most common teeth to be affected by trauma which was found to be similar with the studies done by Ozen B et al (Ozen et al., 2010), David J et al (David and DevinderMohan, 2004) and Ferreira JMS et al (Ferreira et al., 2009).

Based on gender wise distribution of the study population we were able to notice that boys were more frequently affected by traumatic dental injuries than Girls. This was found in accordance with many clinical studies conducted in traumatic injuries in children. In studies conducted by Altun C et al (Ozen et al., 2010), Cavalcanti AL et al (Cavalcanti et al., 2009) and David J et al (David and DevinderMohan, 2004) reported that boys were prone to trauma that girls , and they were more affected .This may be attributed to the behavioural factors, with the boys tend- ing to be more energetic and inclined toward vigorous outdoor activities as compared to girls. Males have a major variety of affected teeth that might be in the higher intensity of the impact or a variety of possible positions of the face at the moment of impact.

In the present study we were able evaluate the types of injuries . From this data we notice that Enamel ,Dentin - crown fracture involving pulp was the most commonly reported traumatic dental injury. On correlating with the chief complaint we were able to see that severe pain, sensitivity and aesthetics were the most common complaints of the patients and their major concern. This was also noticed in previous studies conducted. In a study conducted by Shipra Gupta et al (Gupta et al., 2011)she observed that injury involving enamel and dentin with pulp exposure and enamel/ dentin was found to be the most common which was similar to the studies as reported by Naidoo S et al (Naidoo et al., 2009), Robson F et al (Robson et al., 2009).

Based on the comparison between type of injury and the time of visit to the dentist we were able to notice that most of the patients with severe dental trauma such as crown root fracture ,intrusive luxation, extrusive luxation, soft tissue injuries, avulsion visited the dentist within the first 3 days of the dental injury and about 30% of the patients visited seeking dental care within 3 weeks to 1 month of the injury in case where patient did not have any pain. This was seen in similarity to cases conducted by (Ferreira et al., 2009) and it was also seen that about 41% visited dentists 3 weeks after injury.

Based on the comparison and correlation between the type of injury and the treatment done, it was seen that direct restoration and pain management with pulp capping was the most commonly done treatments in cases of minimal injury. The main aim in cases of traumatic injury was to keep the treatment as minimal as possible. In cases of avulsion ,reattachment was done in cases where it was still viable, seen similarly in clinical study done by (Zuhal et al., 2005). Patients seeking delayed dental treatment require extensive treatment. This also shows the necessity of seeking a dentist opinion and help immediately after the injury.

CONCLUSION

Within the limits of the study we were able to see that fractured teeth/Ellis Class 3 was the most common chief complaint among patients reporting with traumatic injury and they complained of aesthetics

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being the most common concern and most patients visited within one year of the injury. 12-17 years was the common age group affected by traumatic injury and the most component region to be affected was the maxillary anterior region. Males were most commonly associated with traumatic injuries then when compared to females.

AUTHOR CONTRIBUTION

All authors contributed equally to the work.

CONFLICT OF INTEREST

The authors would like to declare that there is no conflict of interests.

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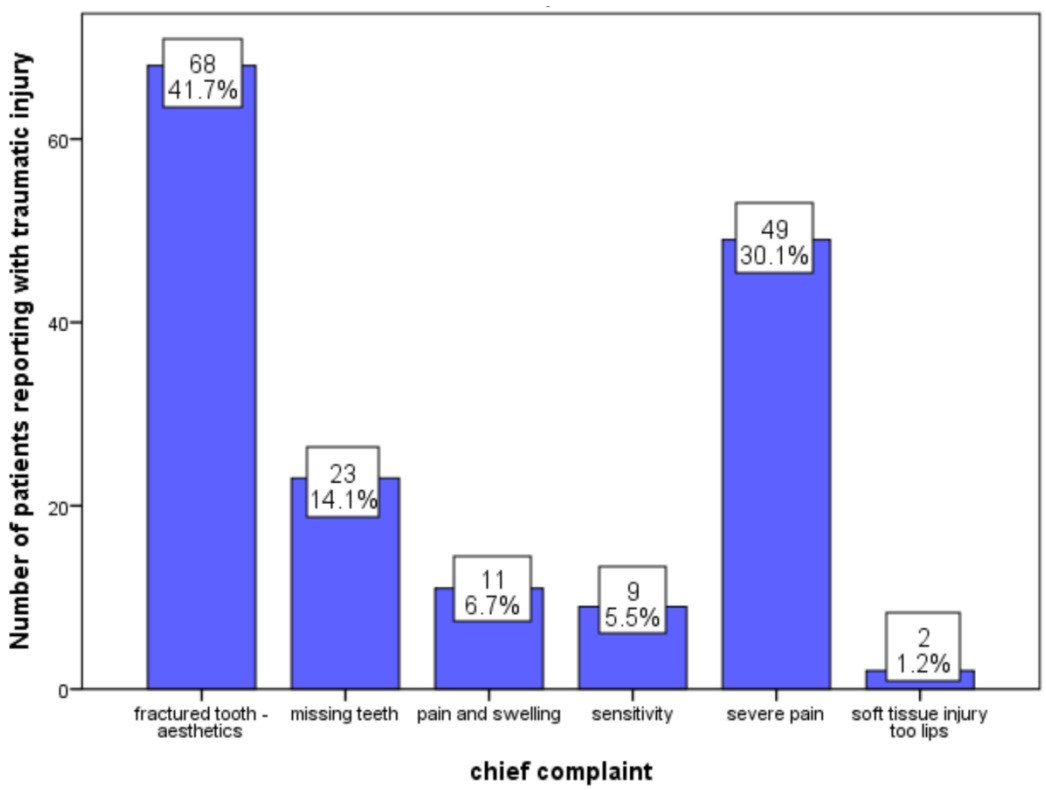

Figure 1: Bar graph represents the chief complaints of pediatric patients reporting with traumatic dental injury. X axis represents the different chief complaints and Y axis represents the number of patients reporting with traumatic dental injury. It was observed that 41.7% of the patients report with fractured teeth and complain of aesthetics followed by 30.1% reporting severe pain as chief complaint .

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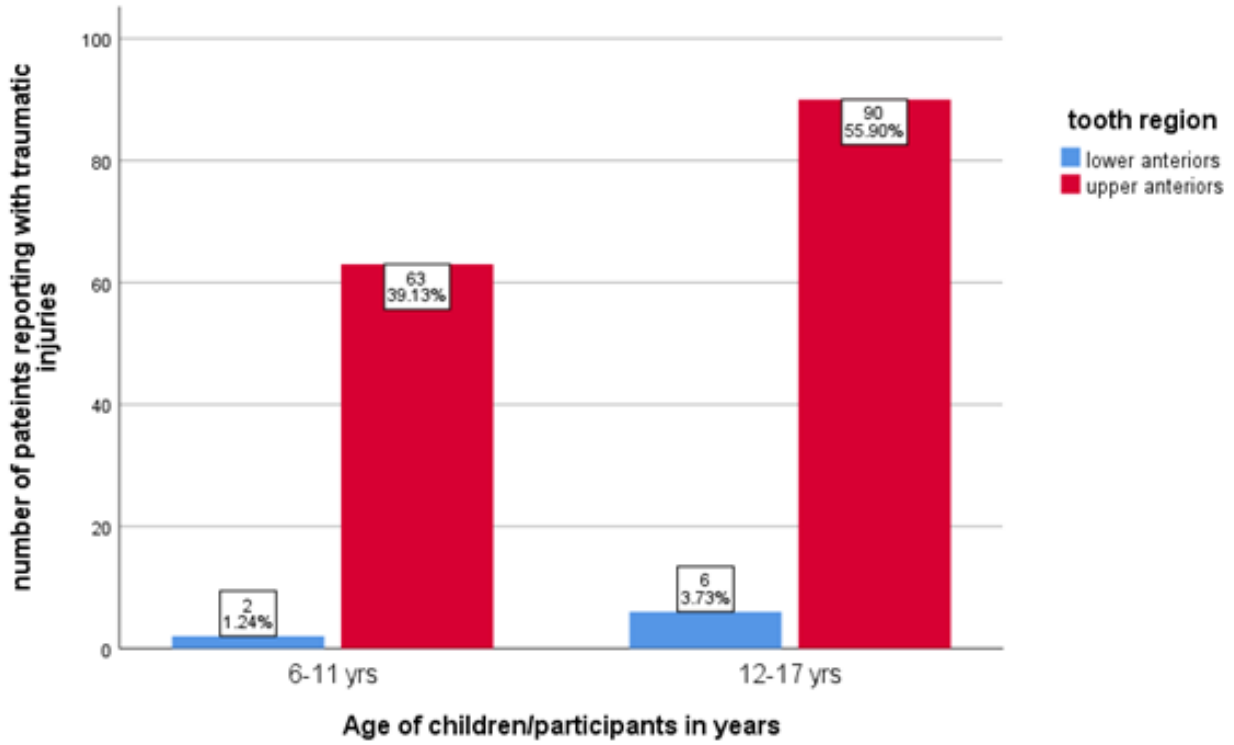

Figure 2 : Bar graph represents association between tooth regions most affected by trauma to age groups of patients reporting with traumatic injury. X axis represents age groups, Y axis represents number of patients reporting with traumatic dental injury. 12-17 years was most commonly affected by traumatic injury and the upper anterior region (red) was most affected. However, Chi square test did not show any statistical significance with Pearson Chi Square value- 0.826^{a}, $p = 0.363 (p > 0.05)$.

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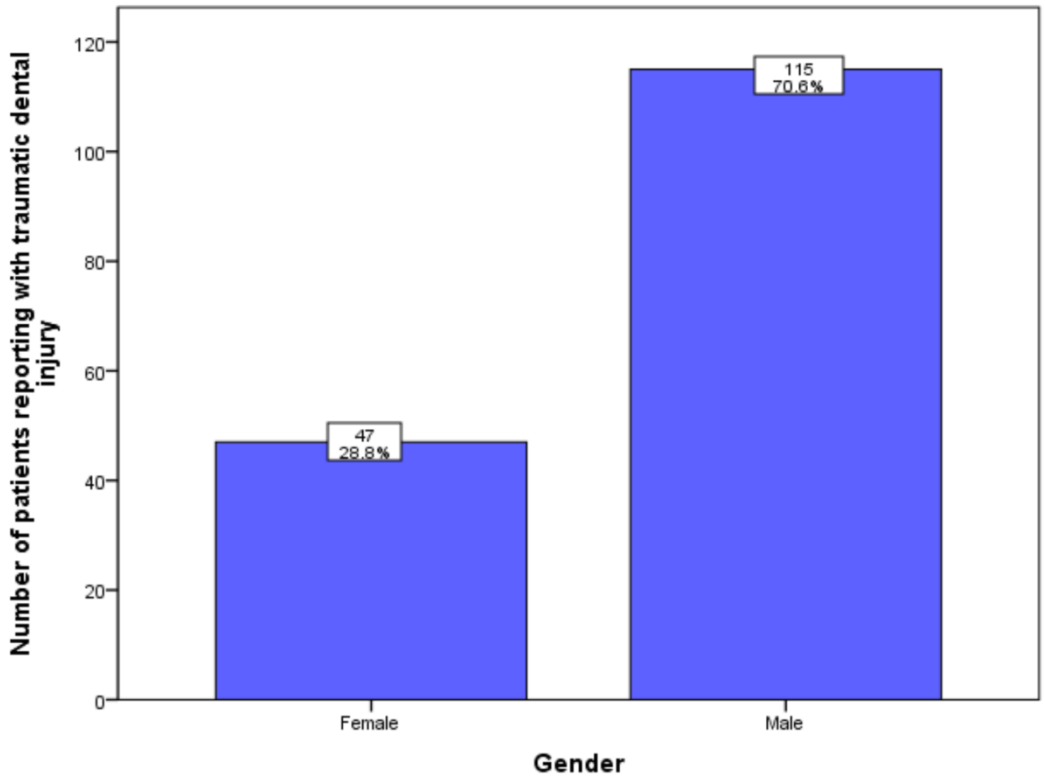

Figure 3 : Bar graph represents the frequency of gender distribution in pediatric patients reporting with traumatic dental injury. X axis represents the Gender and Y axis represents the number of patients reporting with traumatic dental injury. It was observed that 70.6% of the patients who reported with traumatic injury were Male.

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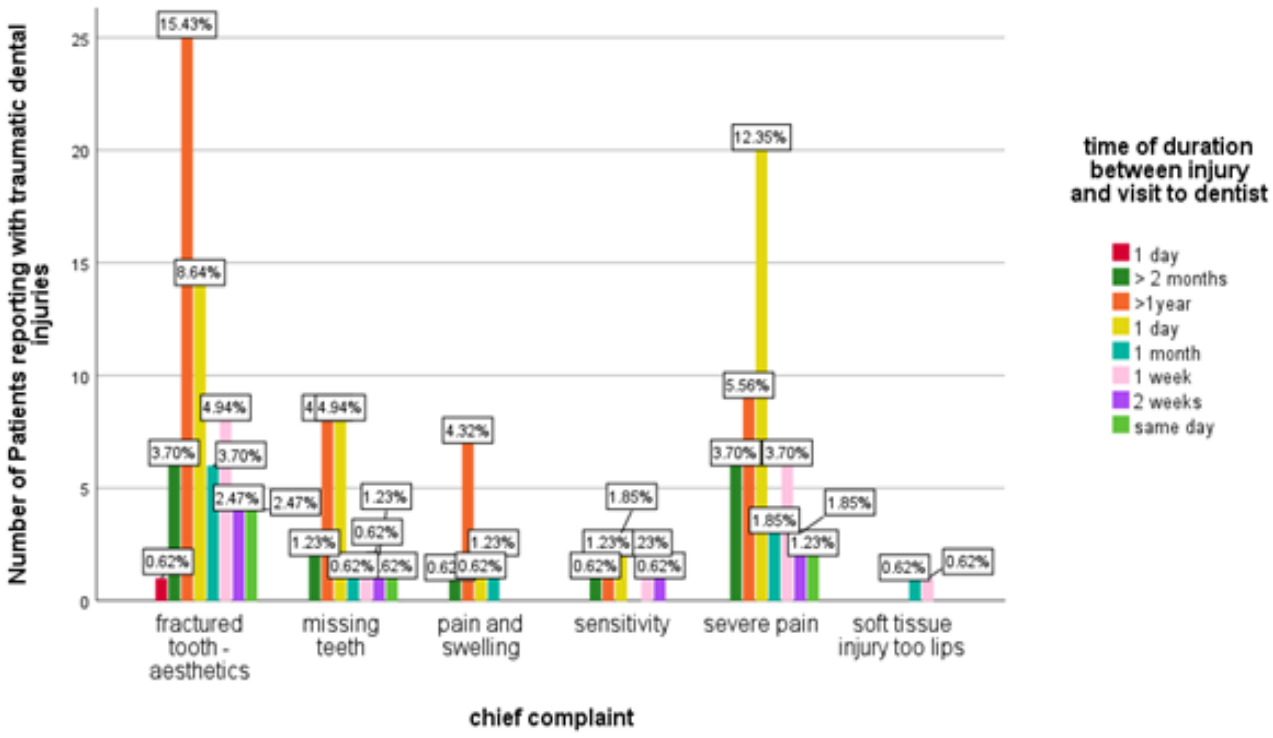

Figure 4 : Bar graph represents association between chief complaints of patients and duration between their injury and visit to the dentist. X axis denotes chief complaint and Y axis denotes the number of patients reporting with traumatic injury. Fractured teeth were the most common chief complaint and they visited the dentist within 1 year of the injury (15.43%). Chi square test showed statistical significance with (Pearson Chi Square value- 195.485[a)] ,p =0.00, (p <0.05).

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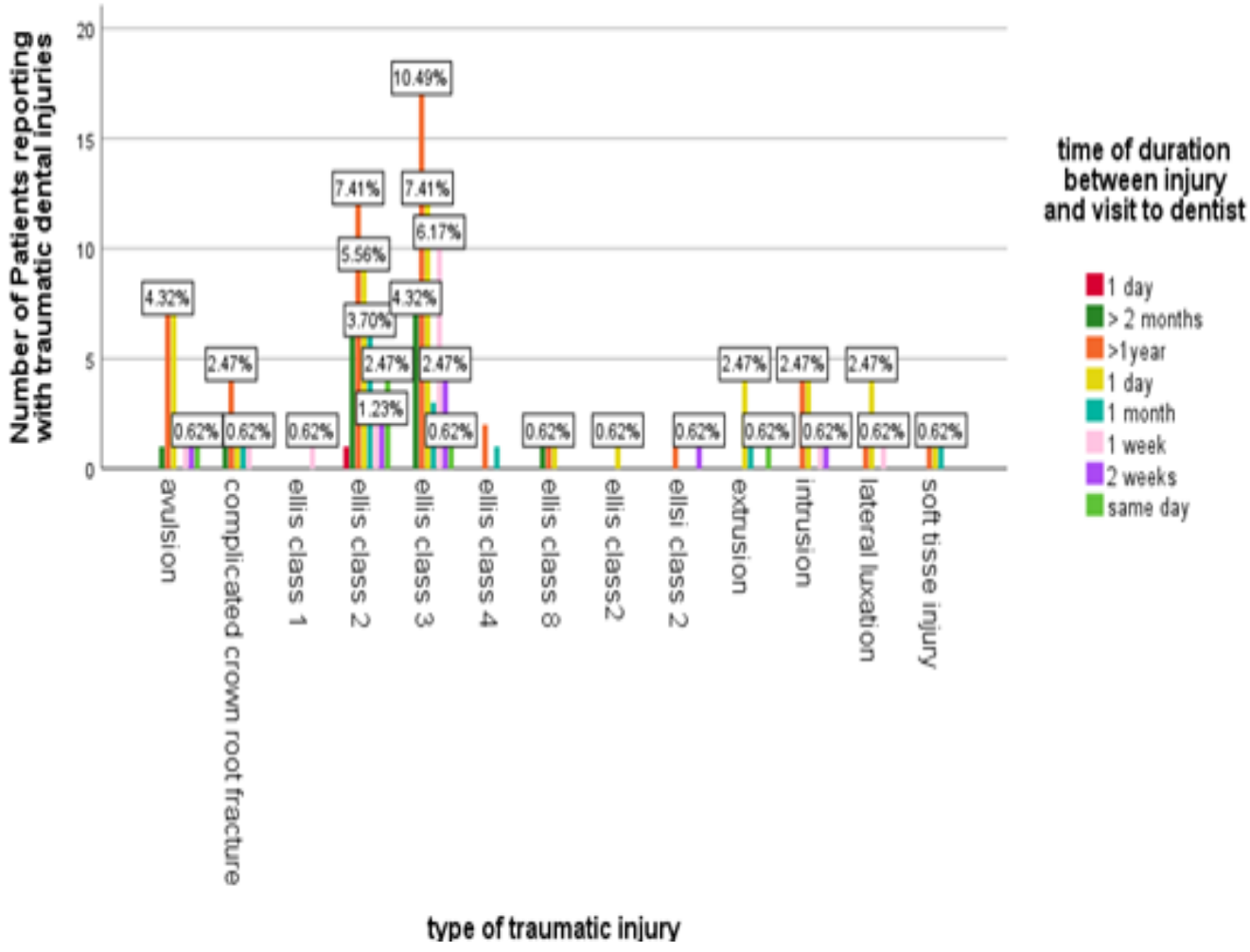

Figure 5 : Bar graph represents association between the type of traumatic injury and duration between their injury and visit to the dentist. X axis denotes type of injury and Y axis denotes the number of patients reporting with traumatic injury. Ellis class 3 fracture-most common traumatic injury and they visited the dentist within 1 year of injury (10.49%). Chi square test showed statistical significance with (Pearson Chi Square value-231.594[a] ,p =0.00, (p <0.05).