



## Prevalence of Traumatic Dental Injuries among Children less than 12 Years Old

Anirudh B. V. M.<sup>1</sup>, Archana Santhanam<sup>\*2</sup>, Nivethigaa B.<sup>3</sup>

<sup>1</sup>Saveetha Dental College, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai – 600 077, Tamil Nadu, India

<sup>2</sup>Department of Oral Pathology, Saveetha Dental College, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai – 600 077, Tamil Nadu, India

<sup>3</sup>Department of Orthodontics, Saveetha Dental College, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai – 600 077, Tamil Nadu, India



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### ABSTRACT

Dental trauma or traumatic dental injuries is an emerging dental problem. Several studies showed that the prevalence of dental trauma has increased in the past few decades. Dental trauma can result in fracture, displacement or loss of a tooth. Dental trauma has been seen more in children who are involved in sports. The aim of the current study was to assess the prevalence of traumatic dental injuries among children less than 12 years old. A retrospective cross-sectional study was conducted where case records were collected and analysed the data of 86000 patients between June 2019 and March 2020 from a private dental institution. The data collected included children below 12 years of age with a history of dental trauma to anterior teeth. The data was tabulated with parameters such as age, gender, fractured tooth, classification of fractured tooth based on ellis classification. Data was imported to SPSS for statistical analysis. Descriptive analysis and chi-square test were used to compare the results. All values were considered statistically significant at P value < 0.005. In this study, boys were more affected (61.5%) with dental trauma compared to girl children. The most common age group involved was 10 to 12 years (66.7%) where the common tooth involved was maxillary central incisors (71.8%), with class 3 being the most common fracture (43.6%). We suggest that educational programs should be organized for the school teachers, children, and parents to improve their knowledge and timely management of dental trauma.

### \*Corresponding Author

Name: Archana Santhanam

Phone: 9962149330

Email: [archana.sdc@saveetha.com](mailto:archana.sdc@saveetha.com)

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### INTRODUCTION

Dental trauma or traumatic dental injury (TDI) is an emerging dental problem which has been neglected in the past years (Juneja *et al.*, 1957). It has been observed that one in ten children are affected with TDI, which require dental treatment. Trauma to an anterior tooth can affect the behaviour of a child; his progress in academics or school and majorly affects his daily life (Reddy, 2017; Swathy *et al.*, 2015). This causes psychological problems in the child, which causes a change in their personality.

Many studies showed that the majority of dental

injuries involve the anterior teeth (Rai and Munshi, 1998; David *et al.*, 2009; Gupta *et al.*, 2011). Studies showed that trauma to primary teeth might cause problems in the eruption of permanent teeth which may lead to malocclusion in the future (Bijella *et al.*, 1990; Norton and Connell, 2012; Mahesh *et al.*, 2014) The main etiology of TDI being accidents such as falls, fights, during sports. The predisposing risk factors are increased overjet, protrusion, open bite etc. (Bendo *et al.*, 2012). Dental trauma does not cause only pain and possible infection, it includes alteration in physical appearance, emotional impacts, speech defects etc. (Sivaramakrishnan and Ramani, 2015)

Untreated fractured teeth that have sharp edges might lead to complications such as trauma to the oral mucosa, if left untreated chances of infection (Kumar *et al.*, 2015) and malignant transformation increases (G Jayaraj *et al.*, 2015; Sherlin *et al.*, 2015; Jayaraj *et al.*, 2015). In addition to this proper oral hygiene has to be followed to prevent the teeth from fracture, if oral hygiene isn't maintained it is a risk factor for several chronic systemic diseases such as heart diseases (Swathy *et al.*, 2015; Gupta and Ramani, 2016; Thangaraj *et al.*, 2016), diabetes and cancer, including hepatocellular carcinoma (Gheena and Ezhilarasan, 2019; Viveka *et al.*, 2016; Sridharan *et al.*, 2017). Ankyloglossia and cleft lip indirectly contribute to TDI. (Shree, 2019; Sridharan *et al.*, 2019). Studies showed that the prevalence of traumatic dental injuries has increased in the past few decades, having a prevalence rate between 6.1% to 58.6% (Juneja *et al.*, 1957). Thus the aim of this study was to assess the prevalence of traumatic dental injuries among children below 12 years in a private dental institution, Chennai.

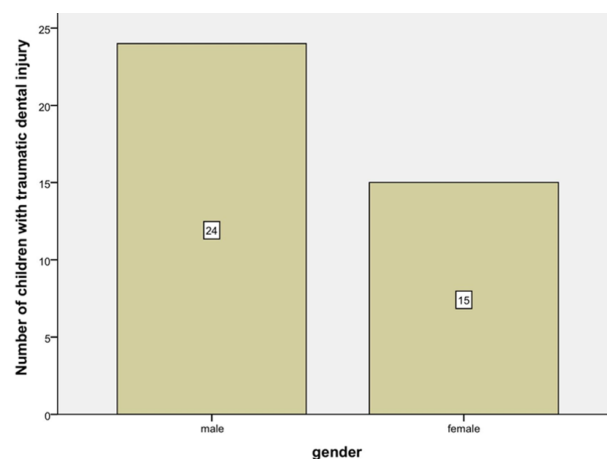
## MATERIALS AND METHODS

A retrospective cross-sectional study was done under a university setting. This study was approved by the Institution's review board. 2 reviewers were involved in this study. The case records were collected and analysed the data of 86000 patients between June 2019 and March 2020 from a private dental institution. The data collected included children below 12 years of age with a history of dental trauma to anterior teeth. The photographs of the oral cavity were taken perfectly, recorded and hence was able to diagnose the findings (Hannah, 2018). The data was then tabulated under parameters such as age, gender, fractured tooth, classification of the fractured tooth, which was based on Ellis and Davey classification. Total samples obtained

were 39. Dependent variables were tooth involved and type of dental fracture. Independent variables were gender and age. The data was then imported to SPSS software which was used for statistical analysis where statistical tests used were chi-square and Pearson correlation, with p-value <0.05 and confidence interval-95%.

## RESULTS AND DISCUSSION

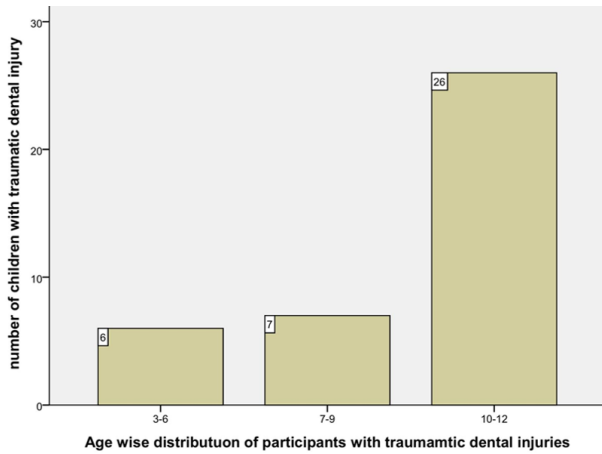
TDI has been neglected in the past few years. TDI affects a child's esthetics and their psychology. (Ningthoujam *et al.*, 2019) Parents are not aware of the seriousness of TDI and are unaware of their management which was shown in many studies (Gurunathan *et al.*, 2014; Gurunathan and Shanmugaavel, 2016; Vaishali and Gurunathan, 2017). There was an inconsistency in lack of knowledge regarding traumatic dental injuries of teeth among general dentists which were seen in the studies (Nandakumar and Nasim, 2017; Ravikumar *et al.*, 2017).



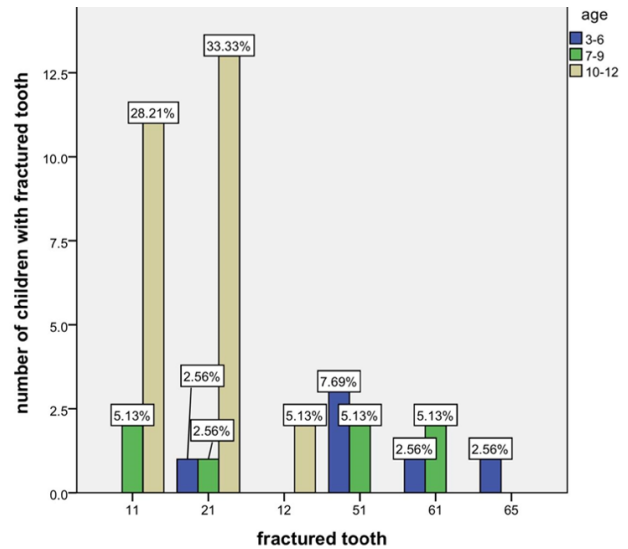
**Figure 1: Bar chart depicting the gender distribution of participants with traumatic dental injuries**

From Figure 1, X-Axis Represents Gender and Y-Axis Represents Number of Children With Traumatic Dental Injuries. Male children (24) have a higher prevalence of traumatic dental injuries. From Figure 2, The X-Axis represents age groups of the study population and Y-Axis represents the number of children with Traumatic Dental Injuries, where 10-12 years was the most prevalent age group for traumatic dental injuries

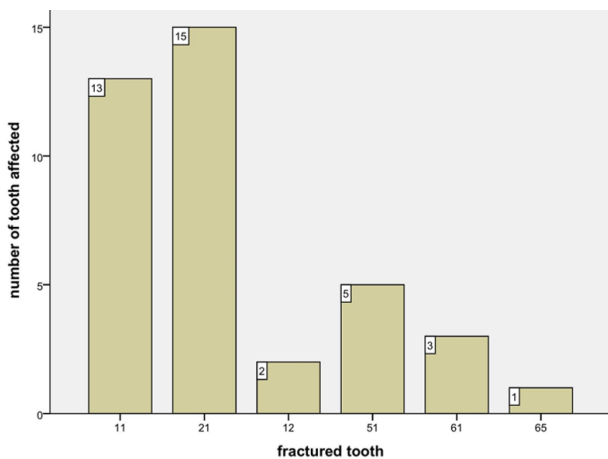
From Figure 3, The X-Axis represents fractured teeth and Y-Axis Represents a number of teeth affected by trauma, 21 is more frequently involved tooth by these injuries (15). From Figure 4, The X-axis represents the type of fractured tooth, and Y-Axis represents a number of teeth affected by trauma, class 3



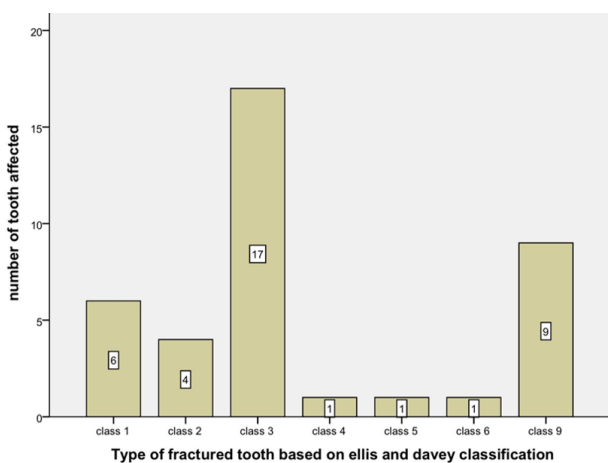
**Figure 2: Bar chart depicting the age-wise distribution of participants with traumatic dental injuries**



**Figure 5: Bar chart depicting the association between age and the number of fractured teeth**



**Figure 3: Bar chart depicting the frequency of fractured tooth among children**



**Figure 4: Bar chart depicting the type of fractured tooth based on Ellis and Davey classification of traumatic dental injuries**

type of fracture (17) were more prevalent.

From Figure 5, X-axis represents fractured tooth, and Y-axis represents a number of children affected by dental traumatic injuries according to age. The most commonly involved fracture tooth was 21 and is seen in children of age group 10-12 [pearson chi-square value-29.633,  $p=0.001$  ( $p<0.05$ ) which is statistically significant]

A total of 39 patients were recorded with traumatic dental injuries, out of which 24(61.5%) were males and 15 (38.5%) were females (Figure 1). Several studies also showed the same results (Pattussi *et al.*, 2006; Reddy, 2017; Juneja *et al.*, 1957). This may be due to the fact that boys tend to be more energetic and are involved in more vigorous outdoor activities, aggressive sports and violence. Within this study, the age group which was most commonly affected with trauma was 10-12 years ( $n=26, 66.7%$ ) followed by 7-9 years (17.9%) then 3-6 years of age group (15.4%) (Figure 2). Previous literature suggests that as age increases, the chance of suffering from TDI increases because of the increased involvement of sports and violence, the data from these studies are in consensus with this parameter (Cavalcanti *et al.*, 2009; Suhasini and Gheena, 2015; Saraswathi and Kumar, 2018)

The most commonly fractured tooth in this study was 21( $n=15, 38.5%$ ) followed by 11( $n=13, 33.3%$ ) where both are maxillary central incisors, thereby having a total of 71.8% prevalence (Figure 3). Similar findings were seen in previous studies done by Rai and Munshi (1998); Suhasini and Gheena (2015); Reddy (2017). The reason could be due to the position of the teeth, which makes them vulnerable to TDI's. (Saraswathi and Kumar, 2018; Shree,

2019)

In this study, the commonest type of tooth fracture according to Ellis Davey classification was class 3 (n=17, 43.6%) followed by class 9 (n=9, 23.1%) (Figure 4). Most of the studies stated that class 1 was the most common fracture (Garcia-Godoy et al., 1986; Traebert et al., 2003; Juneja et al., 1957). It could be hypothesised that maxillary central incisors erupt at an early age and at the time of eruption they are more proclined, making it more vulnerable to fracture due to trauma. The correlation was done between age and the fractured tooth with  $p=0.001$  which is less than 0.05, making it statistically significant (Figure 5). Limitations of the study were short sample size and a unicentred study.

## CONCLUSION

Considering dental traumatic injuries in children, the prevalence was more among boys. Maxillary central incisors were commonly affected teeth due to trauma. Most affected age group was 10 to 12 years and the most common type of fracture seen was Ellis and Davey's class 3. There was a significant association between the permanent maxillary central incisor fracture with the age group of 10 to 12 years. Teacher training health programs and school-based oral health programs should be organised for parents and children to improve their knowledge on the management of traumatic dental injuries and its prevention.

## Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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## REFERENCES

- Bendo, C., Vale, M., Figueiredo, L., Pordeus, I., Paiva, S. 2012. Social Vulnerability and Traumatic Dental Injury among Brazilian Schoolchildren: A Population-Based Study. *International Journal of Environmental Research and Public Health*, 9(12):4278-4291.
- Bijella, M. F., et al. 1990. Occurrence of primary incisor traumatism in Brazilian children: a house-by-house survey. *ASDC journal of dentistry for children*, 57(6):424-427.
- Cavalcanti, A. L., et al. 2009. Traumatic anterior dental injuries in 7- to 12-year-old Brazilian children. *Dental traumatology: official publication of International Association for Dental Traumatology*, 25(2):198-202.
- David, J., Astrøm, A. N., Wang, N. J. 2009. Factors associated with traumatic dental injuries among 12-year-old schoolchildren in South India. *Dental traumatology: official publication of International Association for Dental Traumatology*, 25(5):500-505.
- G Jayaraj et al. 2015. Stromal myofibroblasts in oral squamous cell carcinoma and potentially malignant disorders. *Indian journal of cancer*, 52(1):87-92.
- Garcia-Godoy, F., et al. 1986. Traumatic dental injuries in children from private and public schools. *Community Dentistry and Oral Epidemiology*, 14(5):287-290.
- Gheena, S., Ezhilarasan, D. 2019. Syringic acid triggers reactive oxygen species-mediated cytotoxicity in HepG2 cells. *Human & Experimental Toxicology*, 38(6):694-702.
- Gupta, S., et al. 2011. Prevalence of traumatic dental injuries and role of incisal overjet and inadequate lip coverage as risk factors among 4-15 years old government school children in Baddi-Barotiwala Area. *Medicina Oral Patología Oral y Cirugía Bucal*, 16(7):960-965.
- Gupta, V., Ramani, P. 2016. Histologic and immunohistochemical evaluation of mirror image biopsies in oral squamous cell carcinoma. *Journal of Oral Biology and Craniofacial Research*, 6(3):194-197.
- Gurunathan, D., Shanmugaavel, A. K. 2016. Dental neglect among children in Chennai. *Journal of Indian Society of Pedodontics and Preventive Dentistry*, 34(4):364-369.
- Gurunathan, D., Somasundaram, S., Loo, T. 2014. Knowledge and attitude of parents with regard to avulsed permanent tooth of their children and their emergency management-Chennai. *Journal of Indian Society of Pedodontics and Preventive Dentistry*, 32(2):97-107.
- Hannah, R. 2018. Awareness about the use, Ethics and Scope of Dental Photography among Undergraduate Dental Students Dentist Behind the lens. *Research Journal of Pharmacy and Technology*. *Research Journal of Pharmacy and Technology*, 11(3):1012-1016.
- Jayaraj, G., Ramani, P., Sherlin, H. J., Premkumar, P., Anuja, N. 2015. Inter-observer agreement in grading oral epithelial dysplasia - A systematic review. *Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology*, 27(1):112-116.
- Juneja, P., Kulkarni, S., Raje, S. 1957. Prevalence of traumatic dental injuries and their relation with

- predisposing factors among 8-15 years old school children of Indore city. *Clujul medical*, 91(3):328-335.
- Kumar, A., et al. 2015. Expression of CD 68, CD 45 and human leukocyte antigen-DR in central and peripheral giant cell granuloma, giant cell tumor of long bones, and tuberculous granuloma: An immunohistochemical study. *Indian journal of dental research: official publication of Indian Society for Dental Research*, 26(3):295-303.
- Mahesh, R., Kanimozhi, I. G., Sivakumar, M. 2014. Dilaceration and Eruption Disturbances in Permanent Teeth: A Sequelae of Trauma to Their Predecessors-Diagnosis and Treatment Using Cone Beam CT. *Journal of clinical and diagnostic research*, 8(5):10-12.
- Nandakumar, M., Nasim, I. 2017. Knowledge, attitude, and practice survey on the management of dental traumatic injuries among dental practitioners. *J Adv Pharm Edu Res*, 7(2):46-47.
- Ningthoujam, S., et al. 2019. Parental self-perceived knowledge and attitudes toward emergency management of avulsed permanent teeth in Imphal: A cross-sectional study. *National journal of maxillo-facial surgery*, 10(1):33-42.
- Norton, E., Connell, A. C. 2012. Traumatic dental injuries and their association with malocclusion in the primary dentition of Irish children. *Dental traumatology: official publication of International Association for Dental Traumatology*, 28(1):81-86.
- Pattussi, M. P., Hardy, R., Sheiham, A. 2006. Neighborhood Social Capital and Dental Injuries in Brazilian Adolescents. *American Journal of Public Health*, 96(8):1462-1468.
- Rai, S. B., Munshi, A. K. 1998. Traumatic injuries to the anterior teeth among South Kanara school children-a prevalence study. *Journal of the Indian Society of Pedodontics and Preventive Dentistry*, 16(2):44-51.
- Ravikumar, D., Jeevanandan, G., Subramanian, E. M. G. 2017. Evaluation of knowledge among general dentists in treatment of traumatic injuries in primary teeth: A cross-sectional questionnaire study. *European Journal of Dentistry*, 11(2):232-237.
- Reddy, K. K. K. 2017. Incidence of traumatic dental injuries in children aged 3-18 years in Tirupathi. *International Journal of Pedodontic Rehabilitation*, 2(2):73-73.
- Saraswathi, S., Kumar, R. P. 2018. Prevalence of Permanent Anterior Teeth Trauma in Children Between 8-12 Years in Urban and Rural Districts in Rohtak, Haryana, India. *Biomedical and Pharmacology Journal*, 11(1):469-475.
- Sherlin, H. J., Jayaraj, G., Ramani, P., Premkumar, P., Anuja, N. 2015. Cytomegalovirus and Mucoepidermoid carcinoma: A possible causal relationship? A pilot study. *Journal of Oral and Maxillofacial Pathology*, 19(3):319-324.
- Shree, K. H. 2019. Saliva as a diagnostic tool in oral squamous cell carcinoma—a systematic review with Meta-analysis. *Pathology oncology research*, 25(2):447-453.
- Sivaramakrishnan, S. M., Ramani, P. 2015. Study on the Prevalence of Eruption Status of Third Molars in South Indian Population. *Biology and Medicine*, 07(04).
- Sridharan, G., et al. 2019. Evaluation of salivary metabolomics in oral leukoplakia and oral squamous cell carcinoma. *Journal of oral pathology & medicine: official publication of the International Association of Oral Pathologists and the American Academy of Oral Pathology*, 48(4):299-306.
- Sridharan, G., Ramani, P., Patankar, S. 2017. Serum metabolomics in oral leukoplakia and oral squamous cell carcinoma. *Journal of Cancer Research and Therapeutics*, 13(3):556-561.
- Suhasini, S. J., Gheena, S. 2015. Dental Trauma in Children and Young Adults, Research journal of pharmaceutical, biological and chemical sciences. *Journal of Pharmaceutical Sciences and Research*, 7(6):344-346.
- Swathy, S., Gheena, S., Varsha, S. L. 2015. Prevalence of pulp stones in patients with history of cardiac diseases. *Research Journal of Pharmacy and Technology*, 8(12):1625-1628.
- Thangaraj, S. V., et al. 2016. Molecular Portrait of Oral Tongue Squamous Cell Carcinoma Shown by Integrative Meta-Analysis of Expression Profiles with Validations. *PloS one*, 11(6):156582-156582.
- Traebert, J., Peres, M. A., Blank, V., da Silva Böell, R., Pietruza, J. A. 2003. Prevalence of traumatic dental injury and associated factors among 12-year-old school children in Florianópolis, Brazil. *Dental Traumatology*, 19(1):15-18.
- Vaishali, M., Gurunathan, D. 2017. Awareness and knowledge created by issuing dental avulsion pamphlets to parents of primary school children in Chennai. *International Journal of Pedodontic Rehabilitation*, 2(1):23-23.
- Viveka, T. S., et al. 2016. p53 Expression Helps Identify High-Risk Oral Tongue Premalignant Lesions and Correlates with Patterns of Invasive Tumour Front and Tumour Depth in Oral Tongue Squamous Cell Carcinoma Cases. *Asian Pacific journal of cancer prevention: APJCP*, 17(1):189-195.