

Assessment of Traumatic Dental Injuries among Institutionalized Orphan Children: A Cross-sectional Study

Mridula Goswami¹, Sakshi Bhardwaj²

ABSTRACT

Background: Traumatic dental injuries (TDIs) are impact injuries to the teeth and surrounding hard and soft tissues. It can range from minor tooth fracture to extensive dentoalveolar damage. It affects not only the physiology and function but also the esthetics of the child. They have a high prevalence among children. Children living in orphanage institutions due to parental absence or abandonment are more prone to TDI due to inadequate individualized attention, neglect toward oral health, and lack of awareness regarding TDI among the caretakers. However, the data about the prevalence of TDI among institutionalized orphan children are limited and lacking.

Aim and objective: To determine the prevalence of TDIs in institutionalized orphan children.

Materials and methods: A cross-sectional study was conducted in six institutions for orphan children in New Delhi, India. A total of 500 institutionalized orphan children in the age group of 5–14 years were included in the study. A single calibrated examiner performed the clinical examination in the study sample to evaluate the dental trauma status using the WHO oral health assessment form for children 2013. Data analysis was performed using the Statistical Package for the Social Science-21 (SPSS-21).

Results: The prevalence of TDI was found to be 5.8% among the institutionalized orphan children with a higher prevalence among boys when compared with girls. The most common tooth involved was maxillary central incisors. Enamel and dentin fractures were the most prevalent TDIs.

Conclusion: It is the need of the hour to gather more data regarding TDI and assess their risk factors. This can help in the formulation of plans to raise awareness regarding the prevention and management of TDIs in orphan children with special needs. Adequate knowledge regarding TDI among caretakers can also help prevent these injuries and provide timely intervention for the same.

Keywords: Dental trauma, Institutionalized orphan children, Prevalence.

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INTRODUCTION

Traumatic dental injury (TDI) is considered a public health problem due to its higher prevalence among children.¹ Andersson also concluded that the highest incidence for dental injuries is till 12 years of age, and in higher ages, the incidence is lower.² The TDI may range from a minor crack in the tooth, chipping off a part, to extensive dentoalveolar injuries, which involve the supporting bone, tissues, and may lead to tooth displacement or avulsion.³ The common etiology of TDI among children includes falls, collisions, interpersonal violence, sports-related activities, traffic accidents, and other iatrogenic causes.^{4,5}

There is a paucity of data regarding the prevalence of TDIs in children, especially among the institutionalized orphan group. However, it has epidemiological relevance due to the higher frequency among them.⁶ The incidence of dental trauma may range from 9.4 to 41.6% in primary dentition and 6.1 to 58.6% in permanent dentition.^{7,8} Orphan children are specifically more vulnerable to potentially traumatic events due to interpersonal violence, child abuse, and being forced from their home or care setting, especially in developing countries.⁹ The special living conditions in orphanages with overcrowding of children, improper nutrition, inadequate staff attention make them more prone to traumatic injuries.

The age range between 1 and 3 and 10–12 years is more prone to dental trauma. The age group of 1–3 years is more vulnerable to falls and injury to front teeth as, during this period, the child acquires walking skills with less control on motor coordination. In the age group of 10–12 years, factors like proclined upper front teeth due to the ugly duckling stage make the children more susceptible to

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TDIs.¹⁰ There is also gender predilection, with boys having a higher incidence of dental trauma, which can be attributed to increased indulgence in contact sports and adventure activities.⁵ The factors necessary for determining the type and severity of the injury, its intervention and management, the sequelae, and prognosis are the child's dental age, stage of tooth development, the intensity of force and direction, and shape and size of impacting object.^{5,11}

The lack of awareness regarding the prevalence, prevention, treatment, and management of dental trauma among the caretakers and the inability to access healthcare services and timely intervention increases the chances of having untreated TDIs.^{12,13} The untreated TDI, especially in the anterior tooth, negatively impacts oral health-related quality of life (OHRQoL) because it affects psychosocial behavior apart from functional loss.^{14,15} The TDI may result in a tooth's unsightly fracture, consequently affecting a child's behavior, lower self-esteem, and can have a long-lasting

impact on their life.⁹ Therefore, it is essential to provide timely intervention. There is also an urgent need to assess the prevalence of TDIs among orphan children to obtain a more comprehensive picture of their dental health and for the formulation of adequate preventive and guiding measures. Hence, the present study was planned to determine the prevalence of TDIs in institutionalized orphan children.

MATERIALS AND METHODS

The present study was a cross-sectional study with 500 institutionalized orphan children participating in the age group of 5–14 years. It was conducted in six institutions for orphan children in New Delhi. The study's procedure and purpose were explained to the authorities and children, and informed consent was obtained.

The clinical examination to check already present TDIs in the oral cavity by a single calibrated examiner in the study sample of 500 institutionalized orphan children. The "Dental Trauma Status" was evaluated using the WHO oral health assessment form for children 2013, according to which the teeth affected by dental trauma were coded as follows:

- 0 = No sign of injury
- 1 = Treated injury
- 2 = Enamel fracture only
- 3 = Enamel and dentine fracture
- 4 = Pulp involvement
- 5 = Missing tooth due to trauma
- 6 = Other damage
- 9 = Excluded tooth

The data were collected and subjected to statistical analysis, and determination of the prevalence of TDIs was done. Data analysis was performed using the Statistical Package for the Social Science-21 (SPSS-21).

RESULTS

The study population consisted of 500 institutionalized orphan children living in 6 orphanages. The age of study children ranged from 5 to 14 years, having a mean age of 11.33 ± 2.06 . The study sample comprised 69.7% of males and 30.3% of females.

Out of 500 children, the prevalence of TDI among the study sample was 5.8% ($n = 29$). It comprises enamel fracture, enamel

and dentin fracture, fracture involving pulp, loss of a tooth due to trauma, as shown in Figure 1.

The prevalence of dental trauma was more common among the age group of 10–12 years, as shown in Figure 2. The prevalence was highest in the age group of 10 years and lowest in the age group of 5–8 years. The boys were more commonly affected than girls, as shown in Figure 3.

The tooth most commonly affected with trauma was the maxillary central incisor (90%), followed by maxillary lateral incisor (7%) and mandibular lateral incisor (3%), as shown in Figure 4.

DISCUSSION

Dental trauma (TDI) is an impact injury to the teeth and/or other hard and soft tissues within and around the vicinity of the mouth and oral cavity.⁴ Traumatic dental injury has a higher prevalence among preschool children, school children, and young adults, comprising 5% of all injuries demanding intervention.¹⁶ The consequences are not limited to physical or economic but can also lead to unquantifiable psychosocial burden among the children. Therefore, there is a need for timely intervention, which is not merely providing the dental treatment after the patient first sees the dentist but also the first aid provided at the time of injury as this impacts recovery and prognosis of the dental injury.⁴ However, a child devoid of parental care is associated with deficient awareness regarding oral care and, due to inadequate individualized care, is at a higher risk of more frequent and severe dental trauma.^{17,18} They also have difficulty accessing dental care depending on the institution leading to an increased frequency of untreated dental injuries. The problem is further exaggerated due to a lack of awareness regarding dental trauma among children and caretakers. So, there is utmost need to assess the prevalence of dental trauma in institutionalized orphan children to formulate plans to prevent dental trauma.

The study sample of 500 institutionalized orphan children comprising 151 females and 349 males was included in the study. The gender distribution was based on the availability of orphanages and granting permission by the institutions. Six orphanages with different cultural backgrounds and situated at different locations in New Delhi were included in the study. Ethical approval was obtained to conduct the study. The orphanages have described the purpose and procedure of the study, and informed consent was taken from six orphanages.

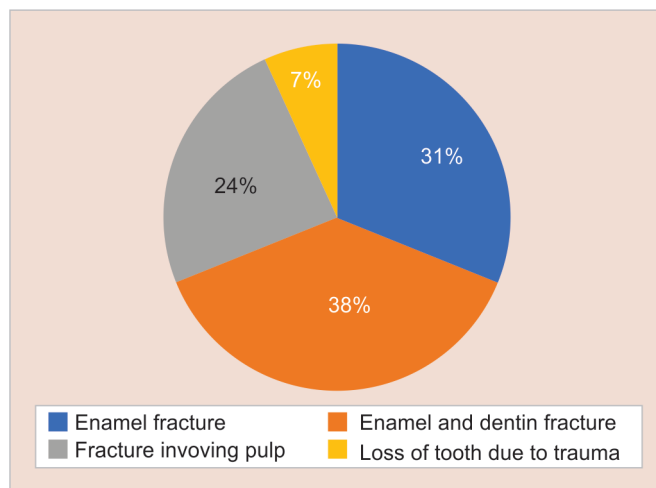


Fig. 1: Types of traumatic dental injuries as evaluated using WHO oral health assessment form for Children (2013)

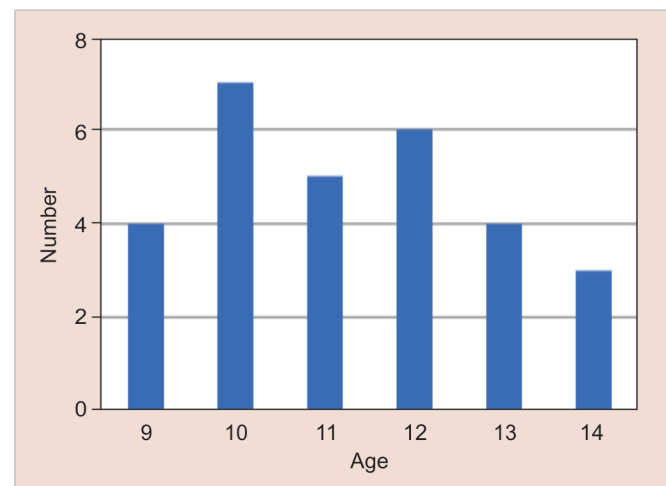


Fig. 2: Age-wise distribution of traumatic dental Injuries

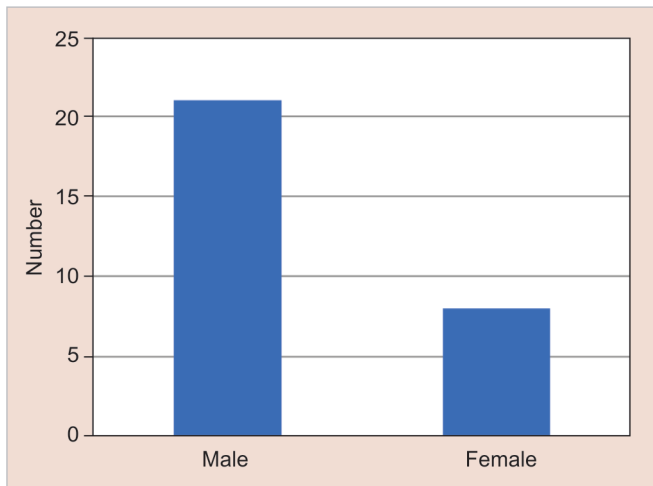


Fig. 3: Gender-wise distribution of traumatic Dental Injuries

The age of institutionalized orphan children in the study ranged from 5 to 14 years with a mean age of 11.33 ± 2.06 years. According to Piaget, children aged 6–12 years have reached the third major stage of cognitive development, the concrete operational phase, and acquires the ability to understand.¹⁹ Whereas, children aged 13–14 years are in the period of intellectual development as the formal operational stage where he/she becomes capable of thinking more abstractly.¹⁹ It is of utmost importance to establish adequate oral routine and knowledge early in life to have a long-lasting impact on oral healthcare. Therefore, children between the age group of 5 years and 14 years were included in the study. The estimation of the effect and prevalence of TDI in the young age group can help in eliminating the long-term adverse effect.

In the present study, 5.8% of children had signs of dental trauma. The most common type of dental injury was enamel and dentin fracture, followed by enamel fracture, fracture involving pulp, and tooth loss due to trauma (avulsion). Rubin et al. conducted a study to assess the overall dental treatment needs of children living in an orphanage in Uganda and found a prevalence of 7.2%.²⁰ Al-Maweri et al. also conducted a study to assess the oral health status of institutionalized orphan children in Sana'a city, Yemen, and revealed a prevalence of 9.9% among orphan children, which was higher than the present study.¹⁰

The prevalence of TDIs was higher among males as compared to females. The prevalence was higher among 10–12 years old children in the present study and can be attributed to the ugly duckling stage of mixed dentition. In a study by Soriano et al. in Brazil among 12 years old school children, a higher incidence of TDI was observed, similar to the present study.²¹ The age group of 10–12 years is more prone to trauma due to more proclined upper anterior teeth, especially maxillary incisors. It was also observed that the most affected tooth was the maxillary central incisor, followed by maxillary lateral incisors and mandibular central incisors. The primary cause of dental injury was a fall in the present study. This was in conjunction with a study by Juneja et al. in India, Stockwell in Australia, and Skaare and Jacobsen in Norway among school children.^{8,22,23}

Traumatic dental injury mostly results as a consequence of sudden, unexpected, and circumstantial accidents. However, they can be prevented with the use of intraoral and extraoral appliances.²⁴ The use of mouthguards can help in eliminating the

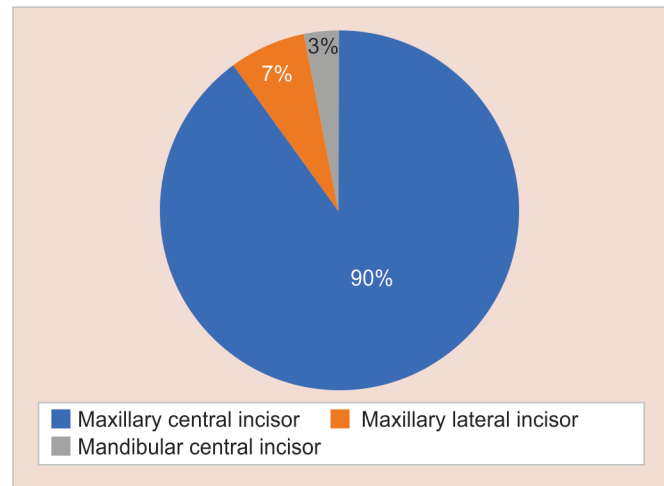


Fig. 4: Teeth Involved in traumatic dental Injuries

risk of trauma to the teeth due to falls especially during sports activities.²⁵ The helmets can also help in the prevention of injuries to oral and pan facial trauma for children involved in contact sports. Therefore, it is essential to create awareness regarding appropriate preventive measures to reduce the risk and prevalence of TDI.

The need of the hour is to collect more data regarding dental trauma among institutionalized orphan children and their risk factors. The age at which children are more prone to traumatic injuries needs to be identified so that preventive measures can be put into effect to protect the risk population to a greater extent. The formulation and implementation of a plan taking into consideration the prevention strategies of dental trauma should be held for children, caretakers, and teachers. Besides, conducting proper educational programs to enhance general knowledge on managing these injuries seems necessary. The programs should also focus on the importance of the proper management of traumatized teeth with complete dental care.

CONCLUSION

The current study observed that young orphaned children (5–14 years) living in orphanage institutions were prone to trauma and had untreated dental injuries. There is a paucity of data regarding TDI along with its risk factor among orphan children. Hence, there is a need to conduct more studies encompassing the prevalence and cause of TDIs among institutionalized children. Traumatic dental injury can hamper physiology and may result in loss of function like mastication and phonetics. Moreover, this age group of children is undergoing personality and psychological development, and any form of trauma leading to an unesthetic appearance may lead to lower self-esteem. Hence, there is a need for programs that entail preventing and managing dental trauma through health promotion and correction of risk factors with emphasis on awareness. This can help in reducing the prevalence of dental injury and subsequently the treatment needs among orphan children. There is reduced access to dental care services, and minor injuries remain unnoticed among institutionalized orphan children. Therefore, the implementation of educational programs for caretakers of orphanages should also be done to enhance their knowledge and provide adequate and timely dental trauma intervention to orphan children.

IMPORTANCE OF THE STUDY

- This study highlights the prevalence of dental trauma among institutionalized orphan children, which can help formulate programs taking into consideration the treatment needs of these children.
- The untreated dental injury depicts the lack of awareness regarding TDIs among institutionalized orphan children and their caretakers. Therefore, there is a need to create awareness regarding dental trauma to provide first aid and timely intervention at the caregiving institutes for the children who need more attention and help from society as they lack routine home care.

REFERENCES

- Petersen PE, Bourgeois D, Ogawa H, et al. The global burden of oral diseases and risks to oral health. *Bull World Health Organ.* 2005;83(9):661–669. DOI: /S0042–96862005000900011.
- Andersson L. Epidemiology of traumatic dental injuries. *J Endod* 2013;39(3 Suppl):S2–S5. DOI: 10.1016/j.joen.2012.11.021.
- Young C, Wong KY, Cheung LK. Emergency management of dental trauma: knowledge of Hong Kong primary and secondary school teachers. *Hong Kong Med J* 2012;18(5):362–370.
- Lam R. Epidemiology and outcomes of traumatic dental injuries: a review of the literature. *Aust Dent J* 2016;61(Suppl 1):4–20. DOI: 10.1111/adj.12395.
- Andreasen JO, Ravn JJ. Epidemiology of traumatic dental injuries to primary and permanent teeth in a Danish population sample. *Int J Oral Surg* 1972;1(5):235–239. DOI: 10.1016/s0300–9785(72)80042–5.
- Pavithran VK, Murali R, Krishna M, et al. Impact of oral diseases on daily activities among 12- to 15-year-old institutionalized orphan and non-orphan children in Bengaluru city: a cross-sectional analytical study. *Indian J Dent Res* 2020;31(3):396–402. DOI: 10.4103/ijdr.IJDR_260_18.
- Norton E, O'Connell AC. Traumatic dental injuries and their association with malocclusion in the primary dentition of Irish children. *Dent Traumatol* 2012;28(1):81–6. DOI: 10.1111/j.1600-9657.2011.01032.x
- Juneja P, Kulkarni S, Raje S. Prevalence of traumatic dental injuries and their relation with predisposing factors among 8–15 years old school children of Indore city, India. *Clujul Med* 2018;91(3):328–335. DOI: 10.15386/cjmed-898.
- Whetten K, Ostermann J, Whetten R, et al. More than the loss of a parent: potentially traumatic events among orphaned and abandoned children. *J Trauma Stress* 2011;24(2):174–182. DOI: 10.1002/jts.20625.
- Al-Maweri SA, Al-Soneidar WA, Halboub ES. Oral lesions and dental status among institutionalized orphans in Yemen: a matched case-control study. *Contemp Clin Dent* 2014;5(1):81–4. DOI: 10.4103/0976-237X.128673
- Kargul B, Welbury R. An audit of the time to initial treatment in avulsion injuries. *Dent Traumatol* 2009;25(1):123–125. DOI: 10.1111/j.1600–9657.2008.00732.x.
- Sabuncuoglu O, Taser H, Berkem M. Relationship between traumatic dental injuries and attention-deficit/hyperactivity disorder in children and adolescents: proposal of an explanatory model. *Dent Traumatol* 2005;21(5):249–253. DOI: 10.1111/j.1600–9657.2005.00317.x.
- Vanagas G, Milasauskiene Z, Grabauskas V, et al. Associations between parental skills and their attitudes toward importance to develop good oral hygiene skills in their children. *Medicina (Kaunas)* 2009;45(9):718–723. DOI: 10.3390/medicina45090094.
- Cortes MI, Marceles W, Sheiham A. Impact of traumatic injuries to the permanent teeth on the oral health-related quality of life in 12–14-year-old children. *Community Dent Oral Epidemiol* 2002;30(3):193–198. DOI: 10.1034/j.1600–0528.2002.300305.x.
- Ramos-Jorge ML, Bosco VL, Peres MA, et al. The impact of treatment of dental trauma on the quality of life of adolescents – a case-control study in southern Brazil. *Dent Traumatol* 2007;23(2):114–119. DOI: 10.1111/j.1600–9657.2005.00409.x.
- DiAngelis AJ, Andreasen JO, Ebeleseder KA. Guidelines for the management of traumatic dental injuries: 1. Fractures and luxations of permanent teeth. *Dent Traumatol* 2012;28(1):2–12. DOI: 10.1111/j.1600–9657.2011.01103.x.
- Shanbhog R, Raju V, Nandlal B. Correlation of status of socially handicapped children with their oral health knowledge, attitude, and practices from India. *J Nat Sci Biol Med.* 2014;5(1):101–107. DOI: 10.4103/0976–9668.127297.
- Solis-Riggioni A, Gallardo-Barquero C, Chavarria-Bolaños D. Prevalence and Severity of Dental Caries in Foster-Care Children and adolescents. *J Clin Pediatr Dent* 2018;42(4):269–272. DOI: 10.17796/1053-4628-42.4.5
- Collins WA. Development during middle childhood: the years from six to twelve. Washington DC (US): National Academies; 1984. pp. 3–4.
- Rubin PF, Winocur E, Erez A, et al. Dental treatment needs among children and adolescents residing in an Ugandan orphanage. *J Clin Pediatr Dent* 2016;40(6):486–489. DOI: 10.17796/1053-4628-40.6.486.
- Soriano EP, Caldas Ade F, Diniz De Carvalho MV, et al. Prevalence and risk factors related to traumatic dental injuries in Brazilian school children. *Dent Traumatol* 2007;23(4):232–240. DOI: 10.1111/j.1600–9657.2005.00426.x.
- Stockwell AJ. Incidence of dental trauma in the Western Australian school dental service. *Community Dent Oral Epidemiol* 1988;16(5):294–298. DOI: 10.1111/j.1600–0528.1988.tb01779.x.
- Skaare AB, Jacobsen I. Primary tooth injuries in Norwegian children (1–8 years). *Dent Traumatol* 2005;2(6):315–319. DOI: 10.1111/j.1600–9657.2005.00362.x.
- Goswami M, Eranhikkal A. Management of traumatic dental injuries using different types of splints: a case series. *Int J Clin Pediatr Dent* 2020;13(2):199–202. DOI: 10.5005/jp-journals-10005-1746.
- Goswami M, Kumar P, Bhushan U. Evaluation of knowledge, awareness, and occurrence of dental injuries in participant children during sports in New Delhi: a pilot study. *Int J Clin Pediatr Dent* 2017;10(4):373–378. DOI: 10.5005/jp-journals-10005-1468.