

Management of a Horizontally Impacted Maxillary Primary Central Incisor: A Case Report and Review of the Literature.

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ABSTRACT

Background: Traumatic dental injuries (TDIs) preceding the eruption of the primary dentition may result in undesirable disruptions, including the failure of the eruption of the primary teeth. Additionally, it may lead to undesirable complications on the permanent tooth's eruption, resulting in anomalies and localised enamel defects.

Objective: To report the management of horizontally impacted maxillary primary central incisor

Case Presentation: A case of trauma to the tooth-bearing area of the maxilla, which occurred at two months of age resulting in failure of eruption of the maxillary primary central incisor (tooth #51). On presentation at 33 months of age, a radiographic evaluation showed a horizontally impacted tooth #51 with a dilacerated root managed by surgical extraction.

Keywords: Traumatic dental injury, Impaction, Dilaceration, Primary Central Incisor.

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INTRODUCTION

Traumatic dental injuries (TDIs) occurring before the eruption of the primary teeth may lead to developmental disturbances as well as failure of eruption of the primary dentition. This incident may result in undesirable sequelae on the permanent dentition.¹ Facial trauma that results in fracture, displacement, delayed eruption or avulsion poses significant negative functional, aesthetic and psychological effects on children, with the greatest incidence of trauma occurring between ages 2 and 3.² TDIs occur in infants and toddlers during motor skills development, while injuries in older children are frequently associated with youthful vigour, involvement in adventurous activities and increasing participation in sporting activities, especially contact sports.³ TDIs commonly affect the anterior teeth because of their prominence on the face. Boys, and now girls, because of their increasing participation in sports,^{4,5} younger children, increased overjet with lip incompetence and children with special healthcare needs, especially those with visual (sensory) and motor impairments, are at an increased risk of traumatic dental injuries.⁶

In Nigeria, the prevalence of TDIs in children between 6 and 16 years ranges from 6.5% to 20.2%, as reported in studies conducted in Kano, Benin and Ibadan.^{6,7,8} Also, studies conducted in Ile-Ife and Ibadan reported the prevalence of TDIs to be 30.8% and 18.8%, respectively.^{9,10} In a cross-sectional study of 346 preschoolers carried out in Ghana, the prevalence of TDIs was reported to be 7.2%.¹¹

Jorge et al. 2009 reported a prevalence of 41.36% of TDIs in primary teeth in Brazilian infants and toddlers, with falls and collisions being the most common causes, accounting for 35.6% of cases.¹² A study conducted in North Carolina, USA, reported a prevalence of 47%.¹³ Conversely, a prevalence of 5.8% was reported among institutionalised children in India.¹⁴

This report is a case of traumatic dental injury that occurred at two months of age with resultant horizontal impaction of maxillary primary central incisor in a 33-month-old female patient.

CASE REPORT

A 33-month-old female, DI, presented to the Paediatric Dentistry Unit of the Department of Child Dental Health in the company of her mother with the primary complaint of a missing upper anterior tooth and consequent poor aesthetics. Her mother

reported that the primary tooth never erupted. At about two months old, she stated that the child fell face down on a hard concrete floor from her baby rocker, resulting in upper lip swelling. The mother conservatively managed the swelling, which subsided after a few days. The mother claims there were no other soft tissue injuries. The medical history revealed that the child was born at a gestational age of 36 weeks via caesarean section due to oligohydramnios. However, there were no perinatal complications, and developmental milestones were uneventful.

Intraoral examination revealed a missing maxillary right primary central incisor. A visible bulge in the region of the unerupted tooth could be palpated (Fig. 1A). All other primary teeth were present with no visible clinical abnormality in shape and form. No abnormality was noted in both the soft and hard tissues.

Radiographic examination showed the missing tooth #51 was horizontally impacted in the alveolar bone, with its growth truncated and associated with a wide, open apex (Fig. 1B). The developing permanent right central incisor was closely related to the horizontally impacted tooth. In addition, there was also a resultant distal displacement of the roots of tooth #52 and tooth #61.

A treatment protocol was developed after carefully considering the patient's age, level of cooperation, position of the primary incisors and location of the permanent central incisors. A decision to surgically extract the impacted primary central incisor under conscious sedation was made. This was explained to the parents, and an informed consent was taken.

Treatment

Baseline investigations were done, including full blood count, electrolytes, urea and creatinine. The results were within laboratory reference ranges and satisfactory. The patient weighed 10kg; 500mg chloral hydrate was administered orally at 50mg/kg. Thirty minutes after administration, a mucoperiosteal flap was raised to expose the crown of tooth #51, which was lying mesiodistally (Fig. 2). The primary incisor was carefully extracted, taking proper care not to interfere with the developing permanent tooth bud (Fig. 3). The extracted tooth was dilacerated, having a sharp bend at the apical one-third. The root appeared short with an open apex (Fig. 4).

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Haemostasis was achieved by applying digital pressure for about 5 minutes, and suturing was done using a resorbable suture material (Fig. 5). The patient DI was placed on Syrup Amoxicillin 250mg 8-hourly for five days, Syrup Metronidazole 200mg 8-hourly for five days, Syrup Ibuprofen 100mg 12-hourly for three days and Syrup Vitamin C 100mg 12-hourly for one week. Post-operative instructions were given and fully understood by the mother. The patient was discharged fully awake, with her vital signs optimal at discharge.

In addition, a 24-hour post-operative review was scheduled. At the review visit, the surgical site appeared clean, oral hygiene was good, sutures in place, and minimal swelling. At a follow-up visit seven days postoperatively, the suture had completely resorbed, and the surgical site was fully healed (Fig. 6).

Periodic recall visits were advised and scheduled every six months to monitor the development of the permanent dentition both clinically and radiographically, to assess that it is in a good position to erupt, and to check for possible development of enamel hypoplasia (Turner's tooth hypoplasia) which is a sequela following trauma to a primary tooth.



Fig. 1A: Frontal view of patient showing the visible labial bulge of impacted tooth #51

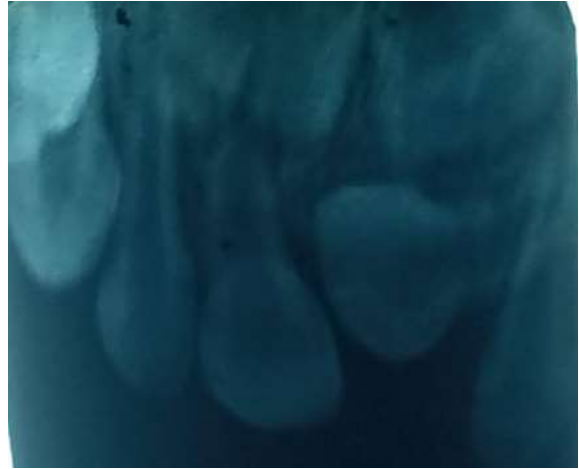


Fig. 1B: Intraoral periapical radiograph showing horizontally impacted tooth #51



Fig. 2: Mucoperiosteal flap raised to expose impacted tooth #51



Fig. 3: Forceps extraction of tooth #51

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Fig. 4: Extracted tooth #51 showing dilaceration of root and open apex



Fig. 5: Haemostasis at surgical site with sutures in place



Fig. 6: Two-week post-operative picture

DISCUSSION

In dentistry, the term 'impaction', derived from the Latin word 'impactus', is defined as a halt in the eruption of a tooth caused by either an evident obstruction in the path of eruption or by an abnormal tooth positioning. An impacted tooth cannot fully erupt into its functional position because its path is obstructed by tissue, bone or another tooth.¹⁵ Some local factors implicated in the aetiology of tooth impaction include tooth mal-positioning, trauma, dilacerations, and ankylosis, while hereditary factors include cleidocranial dysostosis, gingival fibromatosis and cleft palate.^{15,16}

Impaction of permanent teeth is common. However, the impaction of primary teeth is rare, occurring in 1:10,000 cases. A few cases of inverted impacted primary maxillary and mandibular central incisors have been reported. None of these reports associated the impaction to trauma; however, it was not completely ruled out as a possible etiological factor.^{17,18}

Traumatic injuries during the primary dentition stage are a frequently encountered problem in the paediatric dental practice. As a result of the close relationship between the roots of the primary teeth and the developing permanent tooth germs, any trauma to the primary teeth is of significant clinical importance. This is because it often damages the permanent tooth bud due to the effect of the traumatic force transmitted.¹⁹

There are two possible causes of tooth dilaceration, the most common being trauma, as a TDI may cause interference in tooth development and secondly, an idiopathic developmental interference.¹⁹ In patient DI, it can be inferred that the trauma that occurred at two months of age may have caused a disruption in the eruption process and pathway of the maxillary primary central incisor resulting in the horizontal impaction of the maxillary primary central incisor, with subsequent failure of eruption. The eruption of the primary incisors occurs between 6 and 9 months after birth, and root formation is usually complete about 12 to 18 months later.²⁰

Jindal et al. 2013 reported a similar case of horizontal impaction of the maxillary primary central incisors in a 3-year-old girl following trauma at about five months of age. Radiographic investigation also revealed the developing permanent central incisors were closely related to the impacted teeth. The primary central incisors were surgically extracted, and a five-year follow-up revealed hypoplasia of the

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incisal one-third of the permanent maxillary central incisors.¹

Treatment options for an impacted tooth have been grouped into observation, intervention, relocation, and extraction.²¹ Observation refers to no treatment for a specific period, subdivided into pre- and post-impaction periods. Intervention implies a brief period of orthodontic therapy. Relocation is about surgically repositioning an impacted tooth or via orthodontic methods, and extraction denotes the removal of the impacted tooth.²¹ Surgical and/or orthodontic intervention is often required to manage impaction, especially after six months since the eruption of the contralateral tooth.²²

Concerning our case report, the primary maxillary central incisor was extracted because it was horizontally impacted and will interfere with the normal development and subsequent eruption of the permanent maxillary central incisor tooth. Our treatment protocol followed established guidelines by the International Association of Dental Traumatology, endorsed by the American Academy of Paediatric Dentistry for managing TDIs in primary dentition.²³

Clinical Significance

The time of occurrence of TDIs, whether in early infancy or when the child is much older, may reveal its possible sequelae in the primary tooth and the developing permanent dentition. Therefore, the importance of a complete and thorough examination cannot be over-emphasized. This includes evaluating the degree of early childhood injuries extending into the development of all the involved permanent teeth and beyond.

This case report emphasizes the need to provide adequate and thorough information to parents about the presentation and sequelae of dento-alveolar trauma in early childhood and the significance of regular review of the primary and permanent dentitions.

CONCLUSION

Delayed eruption is rare in the primary dentition. However, when it occurs, it should be adequately investigated and promptly managed to rule out or confirm missing teeth or other associated sequelae and anomalies, as reported in this case.

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Conflict of interest

None declared

REFERENCES

1. Jindal G, Kumar D. Developmental malformation of primary and permanent dentition: A rare sequel of trauma. *J Contemp Dent Pract.* 2013; 14(5):944–947.
2. Council O. Guideline on management of acute dental trauma. *Pediatr Dent.* 2009; 31(6):187–193.
3. Eigbobo JO, Etim SS. The pattern of traumatic dental injuries in children in a tertiary health care facility in Nigeria. *J Int Dent Med Res.* 2016; 9(1):33–38.
4. Singh G, Garg S, Damle SG, Dhindsa A, Kaur A, Singla S. A study of sports-related occurrence of traumatic orodental injuries and associated risk factors in high school students in North India. *Asian J Sports Med.* 2014; 5(3):e22766.
5. Azadani EN, Peng J, Townsend JA, Collins CL. Traumatic dental injuries in high school athletes in the United States of America from 2005 to 2020. *Dent Traumatol.* 2022; 39:109–118.
6. Okolo CO, Oredugba FA, Denloye OO, Adeyemo YI. The Risk Factors and Pattern of Traumatic Dental Injuries in 10-12-Year Olds in Kano, Nigeria. *Niger Post Grad Med J.* 2022; 29(3):272–277.
7. Ogordi PU, Ize-Iyamu I N, Adeniyi E O. Prevalence of traumatic dental injury to the anterior teeth in children attending paramilitary and non-paramilitary schools in Nigeria. *Ann Afr Med* 2019;18:80-5
8. Adeyemo YI, Bankole OO, Aladelusi TO, Popoola BO, Denloye OO. Traumatic dental injuries and its effect on quality of life in 12 to 15-year-old children in Ibadan, Nigeria. *Nig J Dent maxillofac traumatol.* 2019 ;(1&2):15–35.
9. Ayebameru OE, Popoola B, Denloye O. Prevalence and predictors of dental caries and trauma among institutionalised and non-institutionalised street children in Ibadan. *African J Oral Heal.* 2019;9(1):21–35.
10. Otuyemi OD, Segun-Ojo IO, Adegboye AA. Traumatic anterior dental injuries in Nigerian preschool children. *East Afr Med J.* 1996;73(9):604–606.
11. Adekoya-Sofowora CA, Newman-Nartey MA, Amoah KG, Amarquaye GP, Akwe RA, Ampomah NK. Prevalence and causes of

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- Traumatic Dental Injuries in Ghanaian Preschoolers in Accra Metropolis, Ghana. *J Paediatr Dent Res Pract.* 2020;1(2): 4–13.
12. Jorge KO, Moysés SJ, E Ferreira EF, Ramos-Jorge ML, De Araújo Zarzar PMP. Prevalence and factors associated to dental trauma in infants 1-3 years of age. *Dent Traumatol.* 2009;25(2):185–189.
 13. Born CD, Jackson TH, Koroluk LD, Divaris K. Traumatic dental injuries in preschool-age children: Prevalence and risk factors. *Clin Exp Dent Res.* 2019;5(2):151–159.
 14. Goswami M, Bhardwaj S. Assessment of Traumatic Dental Injuries among Institutionalized Orphan Children: A Cross-sectional Study. *Int J Clin Pediatr Dent.* 2022;15(1):124–127.
 15. Kaur M, Shefali S. Molar Impactions: Etiology, Implications and Treatment Modalities with Presentation of an Unusual Case. *J Orofac Res.* 2012;2(September):171–173.
 16. Kokich VG. Surgical and orthodontic management of impacted maxillary canines. *Am J Orthod Dentofac Orthop.* 2004;126(3):278–283.
 17. Seraj B, Ghadimi S, Mighani G, Zare H, Rabbani M. Inverted impacted primary maxillary incisors: a case report. *J Dent (Tehran).* 2012;9(2):174–177.
 18. Darwish SM, Salama FS. Impacted primary mandibular central incisors: case report. *J Clin Pediatr Dent.* 2002;26(4):347–349.
 19. Turgut MD, Tekçiçek M, Canoğlu H. An unusual developmental disturbance of an unerupted permanent incisor due to trauma to its predecessor – A case report. *Dent Traumatol.* 2006;22(5):283–286.
 20. Ki NM, Hardman PJ, Welbury RR. Dilaceration of a primary tooth. *Int J Paediatr Dent.* 1991;1:151–153.
 21. Frank CA. Treatment options for impacted teeth. *J Am Dent Assoc.* 2000;131(5):623–632.
 22. Orenuga O, Eigbobo J. Unerupted maxillary central incisors: a case report and review of the literature. *Niger Dent J.* 2008;16(1):21–23.
 23. Day PF, Flores MT, O'Connell AC, et al. International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 3. Injuries in the primary dentition. *Dent Traumatol* 2020;36(4):343–359.