Management of Ectopically Erupted Traumatized Permanent Central Incisor: A Case Report

Anuradha Kumari[1], Asma Jabin[2], Sayantani Saha[3], Simi Philip[4]

[1,2,3,4]PG Student, Dept. of Pedodontics & Preventive Dentistry, Kothiwal Dental College & Research Centre, Uttar Pradesh

***Corresponding Author:**
Email: annusharma369my@gmail.com

Abstract

Eruption of a tooth takes place in a predetermined path. However, if the path gets disrupted, the tooth erupts in absurd direction leading to ectopic eruption. Single tooth malocclusion is one of the most frequently encountered conditions in orthodontic practice. Traumatic injuries to these ectopically erupted teeth and its supporting structures in children and adolescents involving the crown portion of anterior teeth are very common occurrence. This could be due to various predisposing factors such as anterior position, over jet, gender, race, age and ethnicity predispose maxillary anterior teeth for dental trauma. Failure to treat ectopic eruption can result in loss of arch length, inadequate space for the succedaneous tooth, and malocclusion. The present case report highlights the various causes of ectopic eruption and emphasizes that such ectopically erupted and traumatize tooth can be managed by simple orthodontics.

Key Words: Complicated crown fracture, Ectopic eruption of central incisor, Esthetic, Fixed orthodontics.

Introduction

Traumatic injuries to teeth and its supporting structures in children and adolescents involving the crown portion of anterior teeth has become a common occurrence. Roughly 1/4th of school going children experience trauma to their teeth at some point of time. Children of two specific age groups 2-3yrs and 8-12yrs sustain dental trauma more often with boys being prone more than girls.[1,2,3] Epidemiologic studies indicate that maxillary incisors account for 96% of crown fractures, among which maxillary central incisors are involved in 80% of the cases. This could be due to various predisposing factors such as position in the arch, increased over jet, gender, race, age and ethnicity.[3,4,5,6] Complicated fractures with extensive loss of tooth structure may necessitate the use of endodontic posts to strengthen the remaining tooth segment.[7] Single tooth malocclusion is one of the most frequently encountered conditions in orthodontic practice.

Ectopic eruption is a disturbance in which the tooth does not follow its usual course. The prevalence of ectopic eruption is 5.6% and majority of these are permanent central incisors. Maxillary incisors can erupt ectopically or be impacted by overlying supernumerary teeth in up to 2% of the population. Dental ectopia is more frequently seen in girls, but according to Huber there is no evidence for sex prediction. Following local factors can be probable reasons for ectopic eruption of maxillary incisors:[8]

- Supernumeraries
- Retained deciduous teeth
- Traumatic injury to the primary teeth
- Tooth size arch length discrepancy
- Congenital/developmental disturbance, e.g. cleft of palate, single tooth macrodontia
- Genetic factors

Nikiforuk has defined ectopic eruption as "a condition in which the permanent teeth, because of deficiency of growth in the jaw or segment of jaw, assume a path of eruption that intercepts a primary tooth, causes its premature loss and produces a consequent malposition of the permanent tooth. Failure to treat ectopic eruption can result in loss of arch length, inadequate space for the succedaneous tooth, and malocclusion.[9,10]

This case emphasizes such ectopic eruption of incisor that has been successfully managed by simple orthodontics.

Case Report

A 12-year-old adolescent north Indian girl reported to the Department of Pedodontics and Preventive Dentistry, presented with the chief complaint of broken and malaligned upper front tooth. Patient gave history of fall 6 month back that caused fracture of left central incisor(21). Extra oral examination presented a symmetrical face with a convex profile. Intraoral examination revealed complicated crown fracture in 21(Fig. 1A). Ectopic eruption of maxillary left central incisor in the arch (Fig. 1B). Molar relation was Angle's class I with 3-mm overjet and 2 mm overbite. The maxillary midline deviated to the right side and mandibular teeth showed mild crowding (Fig. 1C).

Fig. 1A: Complicated crown malocclusion of 21

Fig. 1B: single tooth crowding

Fig. 1C: Mandibular arch fracture involving 21

Radiographic examination

Periapical radiographs in relation to 11 & 21 showed fracture involving enamel dentin and pulp with absence of periapical pathology (Fig. 2).

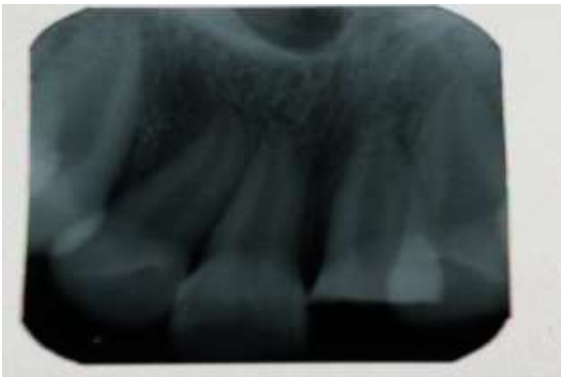

Fig. 2: IOPA showing complicated crown fracture involving 21

Fig. 3: Maxillary and mandibular cast

Cast model analysis

Maxillary and mandibular cast used for cast analysis are shown in Fig. 3. Space analysis was done with Arch perimeter analysis and Carey's analysis showed arch length discrepancy of 1 mm in the maxillary and 1.5 mm in the mandible, respectively.

Treatment objectives

The treatment objectives were to perform root canal treatment with placement of post and core to improve function of 21. To correct the ectopic position of the maxillary central incisor, correct the maxillary midline discrepancy, maintain Class I molar and canine relationship, relieve the crowding on both arches, obtain a normal overjet and overbite, and improve the patient's profile, fixed orthodontic appliance.

Treatment done

- **Endodontic management:** Root canal therapy was initiated on the first visit itself with pulp extirpation. In second visit, the tooth (21) was obturated after thorough biomechanical preparation to predetermined working length. Since the patient had to undergo fixed orthodontic therapy, cast metal post was the post of choice for the same. Before the orthodontic treatment was initiated, a conventional cast metal post was cemented in the root canal, and composite resin core was done.

- **Orthodontic correction:** Following orthodontic consultation, an initial treatment plan was formulated to gain the space of approximately 1 mm in maxillary and 1.5mm in mandibular arch respectively, by proximal stripping. Desired space was achieved following proximal stripping in both the arches. Because of the favourable response to treatment from the patient, no extractions were necessary.

Full-fixed 0.022 slot MBT brackets were bonded on both the arches by the resin composite. For the levelling and alignment, 0.016" nitinol archwire was engaged in the maxillary and mandibular arch (Fig. 4). After the levelling and aligning, 0.016 stainless steel arch wires were engaged in both the arches. After 6 months of orthodontic treatment, a significant amount of progress had been achieved in alignment of maxillary arch to accommodate the ectopic central incisor. (Fig. 5).

On subsequent visit, wires were replaced with 0.016 x 0.022 rectangular, rigid stainless steel arch wires. After 8 months of the treatment, patient had no crowding in the mandibular arch and the ectopic central incisor was well aligned into the maxillary arch. The patient and parents were ecstatic about the treatment progress. To ensure continued satisfactory post treatment alignment of the maxillary and mandibular anterior dentition, the continued use of fixed or removable retainers will be advised. The aligned tooth will be retained for 1year with the help of retainer to prevent any relapse. Finally 21 will be restored with PFM crown.

Fig. 4: 0.016 NiTi arch wires were placed

Fig. 5A: Frontal view showing alignment for levelling and alignment

Fig. 5B: Occlusal view representing alignment of mandibular arch

Fig. 5C: Occlusal view representing alignment of maxillary arch

Discussion

Traumatic injury to anterior teeth accompanying complicated crown fracture of young patient requires immediate attention. Fractured and malpositioned tooth in the anterior region always have been concerned due to damage to esthetic reason, because this have psychological effect on child and his parents.[3,11]

Complicated crown fractures constitute only 4-16% of all traumatic injuries.[3,12,13] Management of such complicated crown fracture is always a challenging task

for the dentist. So the present case with complicated crown fracture of 21 was managed by endodontic treatment. Later it was followed by fixed orthodontic procedure for alignment of central incisor 21 in upper arch and relieves crowding in lower arch.

Restoration with a post after endodontic treatment provides retention of a core to support coronal restoration especially with extensive tooth loss.[3] Orthodontist suggested using metal posts for better strength during orthodontic tooth movements. Thus use of fibre posts was discouraged and metal posts was used in relation to 21.

Traditionally, these posts have been cast or machined from metals, and can be grouped as active or passive posts. Active posts derive their primary retention directly from the root dentine by the use of threads. Passive posts rely primarily on luting cement for their retention.[7,14] In this present case conventional passive post was used and luted with luting GIC.

Yuzugullu et al presented a similar case with multidisciplinary approach. He reconstructed traumatized and fractured left maxillary central incisor by building a composite resin core with a glass fiber post to perform orthodontic treatment before placing porcelain fused to metal crown as final restoration.[7]

The ectopic teeth may be deciduous, permanent or supernumerary teeth. When the eruption path gets disturbed, for example by trauma or premature loss of primary teeth or crowding of teeth, the permanent teeth may erupt ectopically or may not erupt at all or get impacted. Different sites of ectopic eruption reported in the literature are orbit, chin, maxillary sinus, palate and nose. The ectopically erupted teeth if occurs in the anterior region, esthetic problem may occur.[15]

For the treatment of the present case, a composite core was built up to provide aesthetically pleasing temporary restoration to the patient and to attach brackets for controlled tooth movements.

Fixed orthodontic therapy was necessary to achieve proper levelling and alignment. Definitive treatment for aesthetic rehabilitation of discoloured tooth will be planned after completion of orthodontic treatment.

Others treatment options include:

- Observation for spontaneous correction after removal of the etiological agent.
- Interceptive orthodontics should be carried out in order to reduce the severity of the developing malocclusion.
- Orthodontic intervention by means of either removable or fixed appliance in cases where the ectopically erupted incisors need assistance to be brought into correct position.

Clinical experience has shown that light forces are more effective than strong ones in moving ectopically erupted teeth. To ensure continued satisfactory post-treatment alignment of the maxillary and mandibular anterior dentition, the continued use of retainers will be recommended for one year to prevent any relapse.

Conclusion

Knowledge of proper eruption sequence, variations in eruption path, and various sites of ectopic eruption of teeth is essential. This case report emphasizes that the early correction of ectopic eruption is very essential. Traumatic injuries in young children with anteriorly positioned teeth are most common as it is one of the predisposing factors. Correction of single tooth malalignment in anterior region with fixed orthodontics is important to achieve proper levelling and alignment to maintain normal function and aesthetics.

Source of support: Nil

Conflict of Interest: None

Ethical clearance: Yes

References

1. Ram D, Cohenca N. Therapeutic protocols for avulsed permanent teeth: review and clinical update. Pediatr Dent 2004;26:251-5.
2. Schwartz S. Management of traumatic injuries to children's teeth. Crest Oral-B at dentalcare.com. Continuing Education Course, Revised September 27, 2012.
3. Bharath KP, Patil RU, Kambalimath HV, Alexander A. Autologous reattachment of complicated crown fractures using intra canal anchorage: Report of two cases. J Indian Soc Pedod Prev Dent 2015;33:147-51.
4. Oliveira GM, Oliveira GB, Ritter AV. Crown fragment reattachment: Report of an extensive case with intra-canal anchorage. Dent Traumatol 2010;26:174-81.
5. Shulman JD, Peterson J. The association between incisor trauma and occlusal characteristics in individuals 8-50 years of age. Dent Traumatol 2004;20:67-74.
6. Glendor U. Epidemiology of traumatic dental injuries: A 12 year review of the literature. Dent Traumatol 2008;24:603-11.
7. Yuzugullu B, Polat O, Ungor M. Multidisciplinary approach to traumatized teeth: a case report. Dent Traumatol 2008; 24: 27-30.
8. Suresh KS, Uma HL, Nagarathna J, Kumar P. Management of ectopically erupting maxillary incisors: A case series. Int J Clin Pediatr Dent 2015;8(3):227-33.
9. Yaseen SM, Naik S, Uloopi KS. Ectopic eruption - A review and case report. Contemp Clin Dent 2011;2(1):3-7.
10. Nikiforuk G. Ectopic eruption: Discussion and clinical report. J Ont Dent Assoc 1948;25:243-6.
11. Canoglu E, Akcan CA, Baharoglu E, Gungor HC, Cehreli ZC. Unusual ectopic eruption of a permanent central incisor following an intrusion injury to the primary tooth. J Am Dent Assoc 2008;74(8):723-6.
12. Cavalleri G, Zerman N. Traumatic crown fractures in permanent incisors with immature roots: A follow-up study. Endod Dent Traumatol 1995;11:294-6.
13. Ojeda-Gutierrez F, Martinez-Marquez B, Rosales-Ibanez R, Pozos-Guillen AJ. Reattachment of anterior teeth fragments using a modified Simonsen's technique after dental trauma: Report of a case. Dent Traumatol 2011;27:81-5.
14. Ricketts DNJ, Tait CME, Higgins AJ. Post and core systems, refinements to tooth preparation and cementation. Br Dent J 2005;198:533–41.

15. Babshet M, Guttal K, Nandimath K, Sandeep R. Nasal tooth - An ectopic eruption of permanent tooth. Indian J Oral Sci 2015;6:137-9.