

Complex Odontoma Involving Unerupted Permanent Maxillary Right Central Incisor Due to Early Childhood Trauma to Overlying Primary Incisors: An Unusual Case Report

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Abstract

Complex odontoma is a benign, non-aggressive tumor that usually does not exhibit symptoms. The present case had a tooth malformation due to a past injury to the overlying primary incisors. A 13-year-old male patient presented with retained 51 and 52 teeth, and history revealed that the patient had an intrusive trauma at the age of 2 ½ years. Periapical radiograph and cone-beam computed tomography showed the presence of opaque calcified mass at the apices of primary incisors. Surgical excision of the lesion, followed by extraction of supernumerary teeth and mobile primary incisors was done under local anesthesia. Histopathological examination of the lesion confirmed it as a complex odontoma. Esthetic rehabilitation with a removable acrylic partial denture was done and the patient was scheduled for an implant prosthesis after the age of 18 years.

Keywords: Complex odontoma, Compound odontoma, Intrusion, Odontoma-like malformation, Permanent incisor.

INTRODUCTION

Injury to the permanent dentition during the developmental stage as a consequence of trauma to the primary predecessor tooth is very common and the prevalence of such disturbances ranges from 12% to 69%.^[1] Avulsion and intrusive luxation are the most common types of traumatic injuries that disturb the formation of permanent successors.^[2] Various morphological alterations comprise the discoloration of the enamel, enamel hypoplasia, odontoma-like malformations, crown or root dilacerations, root duplications, and partial or complete arrest of the root formation.^[3] These developmental injuries may be simple or complex, local or widespread affecting the crown, root, or whole tooth germ. Enamel hypoplasia is the most common developmental abnormality of permanent dentition.^[4] The severity of these disturbances increases when the permanent tooth bud is at its early developmental stage. The major reason for these malformations is the close relationship between the apices of primary teeth and their developing permanent tooth buds. One of the serious disturbances is an odontoma-like malformation of the permanent tooth. This disturbance is rare, limited primarily to maxillary incisors, when the time of injury occurs between one and 3 years during the morphogenic stage of the dental follicle.^[5] This paper aims

to report the management of an unusual case of odontoma-like malformation in a permanent maxillary central incisor and the impacted supernumerary teeth secondary to early childhood traumatic injury to the primary incisors.

CASE REPORT

A 13-year-old boy visited the Department of Pediatric and Preventive Dentistry with a chief complaint of retained deciduous teeth in the maxillary anterior region. The medical history was non-contributory. On intraoral examination retained 51 and 52 teeth were present (Figure 1a). Past dental history revealed that the patient had an intrusive trauma to 51, 52 due to a self-fall while playing when the patient was two and a half years old. The inflammatory

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symptoms subsided with analgesic treatment and the primary incisors erupted subsequently. An intra-oral periapical radiograph showed the presence of an opaque calcified mass located at the apices of the right primary incisors 51, 52 (Figure 1b). Cone-beam computed tomography confirmed the location of the radio-opaque mass and the presence of supernumerary teeth (Figure 2). Thus, the diagnosis of odontoma-like malformation was confirmed. Surgical excision of odontoma-like malformation, histopathological examination, extraction of supernumerary teeth, and retained primary incisors were planned. The parent's written consent was taken for the procedure. After administering the local anesthesia (lignocaine hydrochloride 2% with epinephrine 1:100,000) the flap was raised and surgical excision of odontoma-like malformation was done (Figure 3), followed by extraction of the supernumerary teeth and poor prognostic primary incisors 51 and 52. The flap was sutured and the patient was given a course of antibiotics and analgesics. The patient reported after 1 week for follow-up and the wound healing was satisfactory.

Histopathological evaluation

Histopathological examination of the lesion showed the presence of a disorganized mass of dental tissues consisting of enamel, dentin, pulp, and spherical calcifications. Odontogenic epithelial strands were seen at the peripheries. This confirmed the lesion as a complex odontoma (Figure 4).



Figure 1: (a) Clinical image showing retained 51 and 52 teeth. (b) IOPA-radiograph showing a radio-opaque lesion at the apices of 51 and 52 teeth

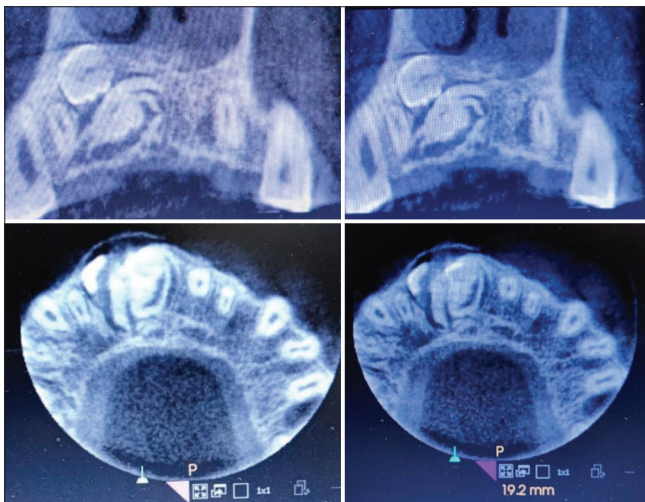


Figure 2: CBCT image showing the location of the radio-opaque lesion and the presence of two supernumerary teeth

After 1 month, the patient reported for esthetic rehabilitation of the missing teeth. To improve the esthetics and phonetics, a removable acrylic partial denture was fabricated and inserted (Figure 5). The patient was recalled periodically for follow-ups. The bony healing was satisfactory and the patient was happy. The patient will be considered for implant prosthesis after the age of 18 years.

DISCUSSION

Traumatic dental injuries in young children can adversely disturb the further growth of developing permanent teeth because of their close anatomical association with the apices of the primary teeth.^[6] Enamel hypoplasia is the most common developmental abnormality of permanent dentition; however, enamel hypomineralization, crown or root dilacerations, and root duplication may also occur. Rare abnormalities include the total or partial arrest of root formation, sequestration of



Figure 3: Intraoperative image showing the surgical enucleation of the lesion



Figure 4: (a) Excised lesion, (b) Histopathological features of complex odontoma



Figure 5: (a) Post-operative 1-month follow-up clinical image showing satisfactory healing, (b) Esthetic rehabilitation with a removable acrylic partial denture

the permanent tooth germ, and odontoma-like malformation.^[7] The present case is a complication arising from an injury to the primary incisor before the age of 3 years.

Odontoma is a benign, not very aggressive tumor, which usually does not exhibit symptoms. Odontomas are divided taking into account the organization and degree of modification of odontogenic cells, there are two classifications: compound and complex odontoma. Compound odontomas exhibit morphological and histological differentiation, while complex odontomas only present with histological differentiation.^[8] The radiological appearance of odontoma depends on their phase of development and degree of mineralization. The first stage is characterized by radiolucency due to a lack of calcification. Partial calcification is seen in the intermediate stage, while in the third stage, the lesion typically appears radiopaque with amorphous masses of hard tissue enclosed by a thin radiolucent zone of connective capsule histologically.^[9] In the present case, the odontoma was in the third stage radiographically, a radiopaque mass with a thin radiolucent zone was appreciated. Odontoma lesions should be differentiated from adenomatoid odontogenic tumors, Odonto-ameloblastoma, and calcifying epithelial odontogenic tumors. The presence of disorganized well-formed dental tissues on histopathologic evaluation confirms the diagnosis of complex odontoma.^[9,10]

The degree of disturbance of the budding germ is related to the severity and direction of the impact on the primary teeth and the phase of developing tooth germ.^[1] The permanent tooth germ is normally situated palatal to the root of the primary tooth. When a force is directed to the labial surface of a primary maxillary central incisor crown, the root will move about labially away from the permanent tooth, this causes less disturbance to the permanent tooth. When a force is directed to the palatal surface of a primary maxillary incisor crown, the root of the primary incisor is moved in a palatal direction thus causing trauma to the developing permanent tooth.^[11] Andreasen *et al.*^[12] described an odontoma-like malformation of the whole

permanent tooth germ due to intrusive luxation or avulsion of the primary tooth. He described that a vertically directed force through the long axis of the primary tooth transmits to the permanent tooth germ causing widespread damage. According to this theory, the malformation occurs during the early stage of odontogenesis and affects the morphogenetic stage of the ameloblast growth of the permanent tooth germ. In the present case, intrusive trauma to the primary incisors was attributed as an etiological factor for odontoma formation. This odontoma had restricted the eruption of the supernumerary tooth; another supernumerary tooth was placed near the nasal floor. Therefore, the treatment plan included surgical excision of the lesion, extraction of supernumerary teeth, and mobile retained primary incisors 51 and 52.

The association between the age of the child at the time of trauma and the resultant disturbances in permanent dentition is critical. Hard-tissue development of permanent maxillary central incisors starts at 3–4 months with completion of enamel formation at 4–5 years of age. Any injury at this age can cause the malformation of the developing permanent teeth.^[13] Signaling pathways responsible for new tooth formation have the capacity to form a supernumerary tooth or an odontoma in reaction to a traumatic injury in the local surrounding area. In addition, there are cases of odontomas that emerge due to the detachment of a segment of a tooth germ which may be from the epithelial sheath of Hertwig or from the enamel organ.^[14] In the present case, the trauma had occurred before 3 years of age and hard-tissue formation of the maxillary central incisor was not yet completed. Odontomas are rarely seen, and their etiology still remains unclear. It has been observed that odontomas have been associated with early childhood trauma to the primary dentition. These benign tumors are normally asymptomatic but may lead to retention of primary teeth, non-eruption of permanent teeth, pain, expansion of the cortical bone, and tooth displacement.^[15]

CONCLUSION

Traumatic injury to the primary teeth can cause odontoma-like malformation in the successor teeth. Pediatric dentists should consider periodic follow-ups and the development of complications, following traumatic injuries to primary teeth. Educate the child patients and their guardians about the clinical importance of early dental management, including esthetic rehabilitation.

SOURCES OF SUPPORT

None.

CONFLICTS OF INTEREST

None.

REFERENCES

- Andreasen JO, Ravn JJ. The effect of traumatic injuries to primary teeth on their permanent successors. II. A clinical and radiographic follow-up study of 213 teeth. *Scand J Dent Res* 1971;79:284-94.

2. Nelson-Filho P, Silva RA, Faria G, Freitas AC. Odontoma-like malformation in a permanent maxillary central incisor subsequent to trauma to the incisor predecessor. *Dent Traumatol* 2005;21:309-12.
3. Kang M, Kim E. Unusual morphology of permanent tooth related to traumatic injury: A case report. *J Endod* 2014;40:1698-701.
4. Torneck CD. Effects and clinical significance of trauma to the developing permanent dentition. *Dent Clin North Am* 1986;41:96-9.
5. Shaked I, Peretz B, Ashkenazi M. Development of odontoma-like malformation in the permanent dentition caused by intrusion of primary incisor-a case report. *Dent Traumatol* 2008;24:e395-7.
6. Diab M, El Badrawy HE. Intrusion injuries of primary incisors. Part I: Review and management. *Quintessence Int* 2000;31:327-34.
7. Andreasen JO. Injuries to developing teeth. In: Andreasen FM, editor. *Textbook and Colour Atlas of Traumatic Injuries to the Teeth*. 3rd ed. Copenhagen: Munksgaard; 1994. p. 457-94.
8. Barba LT, Campos DM, Rascón MM, Barrera VA, Rascón AN. Descriptive aspects of odontoma: Literature review. *Rev Odontol Mex* 2016;20:e265-9.
9. Kodali RM, Venkat Suresh B, Ramanjaneya Raju P, Vora SK. An unusual complex odontoma. *J Maxillofac Oral Surg* 2010;9:314-7.
10. Diab M, El Badrawy HE. Intrusion injuries of primary incisors. Part III: Effects on the permanent successors. *Quintessence Int* 2000;31:377-84.
11. Ravn JJ. Developmental disturbances in permanent teeth after exarticulation of their primary predecessors. *Scand J Dent Res* 1975;83:131-4.
12. Andreasen JO, Flores MT, Holan G, Borum M. Injuries to the primary dentition. In: Andreasen FM, Andreasen L, editors. *Textbook and Color Atlas of Traumatic Injuries to the Teeth*. 4th ed. United States: Blackwell Publishing; 2013. p. 533-7.
13. Borum MK, Andreasen JO. Sequelae of trauma to primary maxillary incisors. I. Complications in the primary dentition. *Endod Dent Traumatol* 1998;14:31-44.
14. Wang XP, O'Connell DJ, Lund JJ, Saadi I, Kuraguchi M, Turbe-Doan A, *et al.* Apc inhibition of Wnt signaling regulates supernumerary tooth formation during embryogenesis and throughout adulthood. *Development* 2009;136:1939-49.
15. Silva DR, Shahinian AL. Odontoma malformation and disturbances of eruption subsequent to traumatic dental injuries: A literature review and a case report. *Dent Traumatol* 2022;38:98-104.