

Compound odontoma causing impaction of mandibular canine: A case report

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A female patient, 11 years of age reported with a chief complaint of crooked teeth. The clinical examination showed a convex and hyper divergent profile with a dolico-facial pattern, moderate crowding in both arches with a mixed dentition dental status. Radiological examination revealed an impacted left mandibular canine with an overlying deciduous canine and a calcifying structure that had pushed the impacted canine close to the lower border of the mandible. Successful surgical removal of the calcifying structure and facilitation in eruption of the impacted canine culminated the treatment of this unusual case. Histopathology revealed the structure to be compound odontoma. Post-orthodontically the patient received a satisfactory occlusion and an attractive smile.

Introduction

Odontomas are considered to be developmental anomalies resulting from the growth of completely differentiated epithelial and mesenchymal cells that give rise to ameloblasts and odontoblasts. These tumors are basically formed of enamel and dentin but they can also have variable amounts of cementum and pulp tissue.¹

During the development of the tumor, enamel and dentin can be deposited in such a way that the resulting structure may show an anatomic similarity to normal teeth, in which case the lesion is classified as a compound odontoma. However when the dental tissues form a simple irregular mass occurring in a disorderly pattern, it is described as a complex odontoma.² Compound odontomas appear more frequently than complex

odontomas.^{3,4}

These odontogenic tumors can be found anywhere in the dental arches. The majority of odontomas which are located in the anterior region of the maxilla are compound, while the great majority of odontomas located in the posterior areas, especially in the mandible are complex odontomas.^{5,6} The etiology of the odontomas is unknown. However it has been suggested that trauma and infection at the place of the lesion can offer ideal conditions for its appearance.^{7,8}

In general they are asymptomatic, have slow growth and seldom exceed the size of a tooth but when large, can cause expansion of the cortical bone.^{1,2} Odontomas may be diagnosed at any age but they are usually detected during the first two decades of life.^{1,3} Many times odontomas are found associated with unerupted teeth.⁹⁻¹³ The canines, followed by maxillary central incisors and third molars are the most frequent teeth impacted by odontomas.⁴ In a very few instances odontomas are related to missing teeth.⁸ Generally these malformations are intra-osseous but occasionally they may erupt into the oral cavity.¹⁴ Radiographic aspects of odontomas are characteristic. The complex odontoma appears as an irregular mass of calcified material surrounded by a thin radiolucent area with smooth periphery and

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the compound type shows calcified structures resembling teeth in the center of a well-defined radiolucent lesion.¹⁴

A developing odontoma can be discovered by routine radiography but may cause difficulty in identification due to lack of calcification.⁷ The histological examination of odontomas often show the presence of enamel matrix, dentin, pulp tissue and cementum that can, but need not exhibit a normal relationship.^{1,7} Odontomas are treated by conservative surgical removal and there is little probability of recurrence.^{1,8} It has been suggested that all specimens should be sent to an oral pathologist for microscopic examination.^{7,8} Proper patient care should include careful clinical and radiological follow-up.¹⁵ When odontomas are associated with unerupted teeth, orthodontic traction of the impacted tooth soon after removal of the lesion may be needed, especially if it is not diagnosed and treated early.^{5,12}

Diagnosis and Etiology

A female patient, 11 years of age reported with a chief complaint of crooked teeth. Medical and dental histories were insignificant. Patient was both externally and internally motivated. Diagnostic records were taken that included photographs both extra and intraoral, panorex, lateral cephalogram and casts. Extra orally the patient had a well proportionate and symmetric face with dolico-facial pattern. Profile was convex with a hyper divergent pattern (Figure 1). Nose was of average length and shape. Lip lengths were normal with competent postures. Incisal show at rest and during smile, were both within normal range. Functional analysis revealed no abnormality with the TMJ function. Intra-orally the patient had partially erupted right buccal segment, retained mandibular left deciduous canine and maxillary left deciduous second molar, class one incisors and molars with coincident midlines (Figure 2). Mandibular right deciduous second molar

had exfoliated. Maxillary left canine, first and second premolars had partially erupted. Cephalometric analysis revealed sagittal class I, hyper divergent vertical pattern with proclined upper and lower incisor (Figure 6). Lips were protrusive with respect to the esthetic and Steiner's line. On panorex (Figure 7a) there was a radio opaque structure hindering the path of mandibular canine. Preliminary diagnosis was that of an odontoma.

Treatment Objectives

The treatment objectives were to create a satisfactory occlusion with a class I molar and canine relationship, normalize over-jet and over-bite. Simultaneously extraction of the pathological lesion and eventual traction of the impacted canine was one of the major goals of treatment that would result in a canine guided bilateral occlusion. Crooked teeth would be straightened with the straight wire fixed appliance system.

Treatment Alternatives

The patient was presented with the alternative plan of the removal of the impacted tooth if it did not respond to the traction forces. Options regarding replacement were also discussed. Similarly advancement genioplasty with vertical reduction was proposed at adult age. Parents agreed to plan involving the removal of the pathology and eventual closed traction of the canine.

Treatment Progress

Deciduous teeth were extracted and fixed appliance was bonded.

Nickel titanium wires were inserted from 0.012" to 0.020" in normal succession, by passing the lower canine area. Once on stainless steel wires the patient was referred to oral surgeon to extract the pathological lesion (Figure 3). After extraction, postoperative oral and written instructions



Figure 1. Pre-treatment extra-oral photographs



Figure 2. Pre-treatment intra-oral photographs

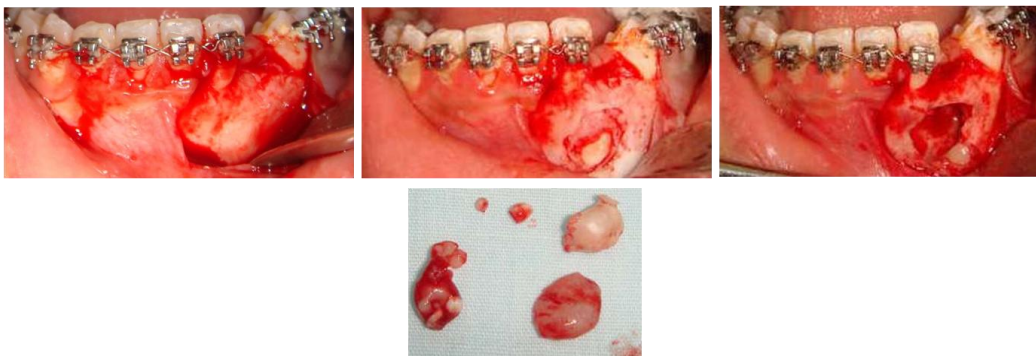


Figure 3. Surgical removal of odontoma

specifically related to the maintenance of an appropriate oral hygiene, ingestion of cold and soft meals, refraining from physical exercise during 48 hours and management of pain were given to the patient's mother. The biopsy sample was then sent for histopathological assessment to Armed Forces Institute of Pathology. The diagnosis was that of a compound odontoma. The impacted canine was pulled with a constant traction to

the main arch wire being 0.016 x 0.022" S/S and the attachment via a pig tail. Gradually the impacted canine was brought to the occlusal level. Eventually it was added to the main appliance with the piggy back technique. The sequences lead to finishing. The case was finished with bilateral class I molar, canines and coincident midlines (Figure 4&5).



Figure 4. Post-treatment extra-oral Photographs



Figure 5. Post-treatment intra-oral photographs

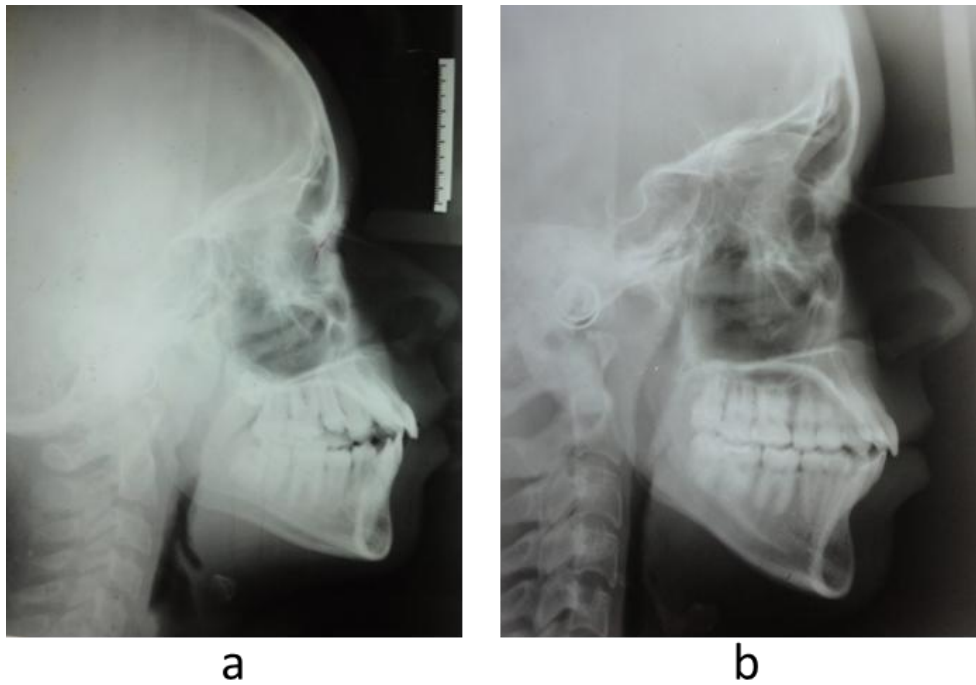


Figure 6. a) Pre-treatment cephalogram b) post-treatment cephalogram

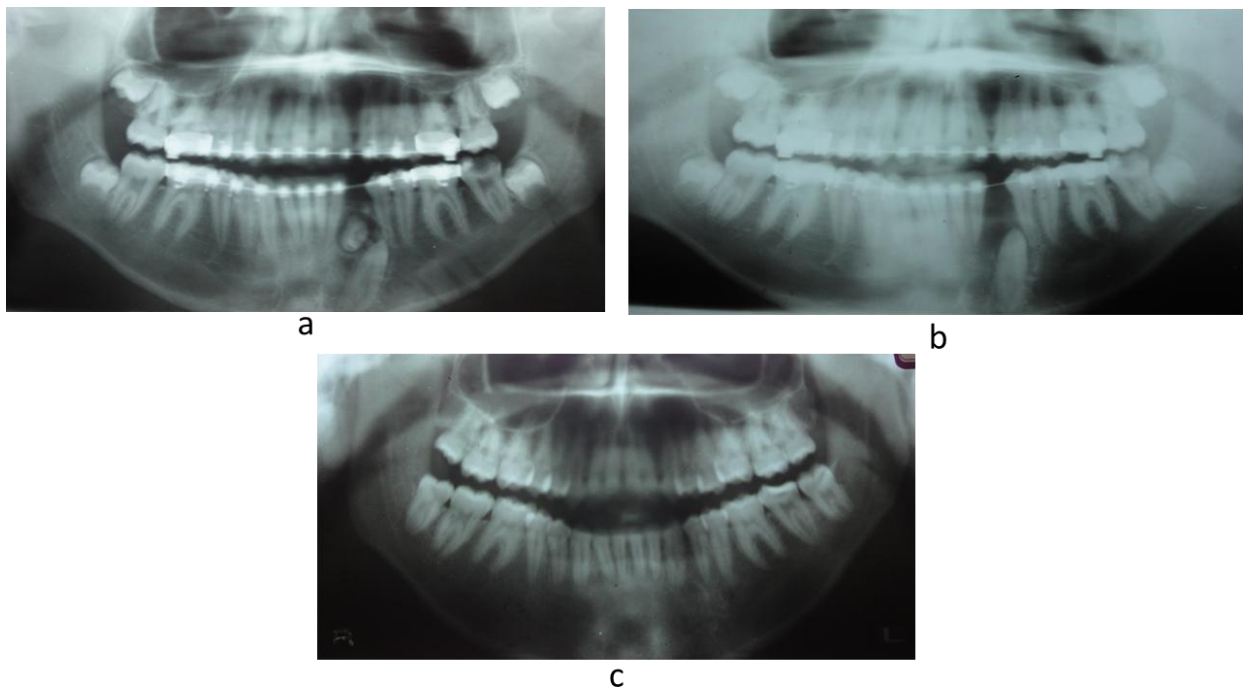


Figure 7. a) Panorex showing odontoma causing impaction of left mandibular permanent canine b) Four months after surgical removal of odontoma c) Post-treatment

Results and Discussion

Odontomas are relatively common odontogenic lesions generally asymptomatic and are rarely diagnosed before the second decade of life. They frequently lead to impaction or delayed eruption of permanent teeth.^{1,2} The case reported in this study was initially diagnosed as compound odontoma since the radiographic examination of the lesion showed a variable number of calcified interior structures anatomically similar to teeth.^{1,2,8,9} This diagnosis was later confirmed by histological examination of the lesion after its surgical removal.

Complete root formation of the unerupted canine had occurred, making it necessary to use orthodontic traction of the affected tooth in order to guide it to an adequate position in the dental arch. This therapeutic approach is recommended by Bengston,⁵ Oliver and Hodges.¹² When the impacted tooth came into the dental arch it had the same clinical crown height was similar to the contra-lateral. This result was due to the minimized trauma to the gingiva and surrounding tissues during the surgical procedure and by the use of a "closed eruption technique", which guided the tooth to the alveolar crest. In this technique the surgical flap is repositioned and sutured in place in a way that only the ligating wire attached to the bonding attachment which is bonded to the buccal surface of the unerupted tooth, is exposed into the oral cavity. With a sub optimal result of the gingival contour, it is still possible to restore an adequate gingival margin appearance by performing periodontal surgery.

Ideally odontomas should be removed when the permanent teeth adjacent to the lesion exhibit about one half of their root development because this ensures safety of the normal permanent teeth and prevents interference with their eruption. Kaban¹⁶ states that odontomas are easily enucleated and adjacent teeth that may have been displaced by the lesion are seldom harmed by

the excision since they are usually separated from the lesion by a septum of bone. In this case iatrogenic damage to the root formation of these teeth is very unlikely.¹⁶ The early diagnosis and treatment of the pathology in this case probably could have prevented the impaction of the permanent left lower canine. Clinical experience suggests and the dental literature supports that an individualized radiographic examination of any pediatric patient that presents clinical evidence of delayed permanent tooth eruption or temporary tooth displacement with or without a history of previous dental trauma should be performed. As was demonstrated by this report, early diagnosis of odontomas allows adoption of a less complex and expensive treatment ensuring better prognosis.

Conclusions

Variation in the normal eruption of teeth is a common finding, but significant deviations from established norms should alert the clinician to further investigate the patient's health and development. Delayed tooth eruption might be a harbinger of a systemic condition or an indication of altered physiology of the craniofacial complex. Orthodontists are often in an ideal position to perform an early evaluation of craniofacial structures, both clinically and radiographically. Proper evaluation of such pathologies in orthodontic diagnosis and treatment can and should facilitate an optimum result.

References

1. Neville BW, Damm DD, Allen CM, Bouquot JE. Oral and Maxillofacial Pathology. Philadelphia: Saunders.1995, pp 531-33.
2. Cawson RA, Binnie WH, Eveson JW. Color Atlas of Oral Disease. Clinical and Pathological Correlations. Hong Kong: Mosby-Wolfe.1993, pp 6-19.
3. Owens BM, Schuman NJ, Mincer HH, Turner JE, Oliver FM. Dental odontomas: a retrospective study of 104 cases. J Clin Pediatr Dent.1997; 21:261-4.

4. Katz RW. An analysis of compound and complex odontomas. *ASDC J Dent Child*.1989;56:445-9.
5. Bengston AL, Bengston NG, Benassi, LRDC. Odontomas em pacientes pediátricos. *Revista de Odontopediatria*.1993;2:25-33.
6. Budnick SD. Compound and complex odontomas. *Oral Surg Oral Med Oral Path*.1976;42:501-6.
7. Shafer WG, Hine MK, Levy BM. *A Textbook of Oral Pathology*, 4th Ed. Philadelphia: Saunders.1983, pp 308-11.
8. Areal-López L, Silvestre DF, Gil LJ. Compound odontoma erupting in the mouth: 4 year follow-up of a clinical case. *J Oral Pathol*.1992; 21:285-8.
9. Shulman E, Corio RL. Delayed eruption associated with an odontoma. *ASDC J Dent Child*.1987; 54:205-7.
10. Brunetto AR, Turley PK, Brunetto AP, Regattieri LR, Nicolau GV. Impaction of a primary maxillary canine by an odontoma: surgical and orthodontic management. *Pediatr Dent*.1991;13:301-2.
11. Gallien GS, Schuman NJ, Sharp HK, McIlveen LP. Odontoma of a maxillary central incisor in a 10-year-old black male. *J Pedod*.1986;10:352-55.
12. Oliver RG, Hodges CGL. Delayed eruption of a maxillary central incisor associated with an odontome: report of case. *ASDC J Dent Child*.1988; 55:368-71.
13. Thwaites MS, Camacho JL. Complex odontoma: report of case. *ASDC J Dent Child*.1987;54:286-8.
14. Giunta JL, Kaplan MA. Peripheral, soft tissues odontomas. *Oral Surg Oral Med Oral Pathol*.1990; 69:406-11.
15. Philipsen HP, Reichart PA, Praetorius F. Mixed odontogenic tumors and odontomas. Considerations on interrelationships. Review of the literature and presentation of 134 new cases of odontomas. *Oral Oncology*.1997;33:86-99.
16. Kaban, LB: *Pediatric Oral and Maxillofacial Surgery*. Philadelphia: Saunders.1990, pp 111-12..