Compound odontoma causing impaction of primary tooth in a 4-year-old child: case report

Impacção de dente decíduo por presença de odontoma composto em criança de 4 anos: relato de caso

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Abstract

Objective: to report a rare case of impaction of a primary mandibular incisor due to the presence of a compound odontoma and describe its clinical management. Case report: a 4-year-old boy presented with a "missing" primary left mandibular lateral incisor. Radiographs showed impaction of the unerupted incisor by adjacent radiopaque structures consistent with a compound odontoma. The patient was recalled periodically for 2 years, at which time surgical excision was performed. The diagnosis of compound odontoma was confirmed histologically, and the permanent mandibular central incisors erupted uneventfully; the patient was referred for orthodontic treatment. Final considerations: this case report describes an unusual case of compound odontoma associated with an unerupted deciduous tooth; odontomas are rare in this age range, occurring predominantly in the second decade of life and in association with impaction of permanent teeth. We also propose a protocol for clinical management of such early-onset cases.

Keywords: Odontoma. Deciduous tooth. Impacted tooth.

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Introduction

Odontomas are odontogenic tumors with heterogeneous histopathological types and clinical behaviors. Although they are classified in the literature as neoplasms, they are more appropriately described as hamartomas (developmental malformations)[1]. The prevalence of odontomas is controversial, ranging from 22 to approximately 70%[1], although there is a broad consensus that they represent one of the most common types of odontogenic tumor[2].

Odontomas are divided into two main types: compound and complex. Compound, or composite, odontomas are made up of numerous small, tooth-like structures. Complex odontomas comprise an amorphous mass of dental tissue, and do not resemble teeth[3]. Radiographically, compound odontomas are seen as small, radiopaque, tooth-like structures of varying shapes, surrounded by a radiolucent zone. Complex odontomas, in turn, are seen as a single, well-defined, radiopaque mass surrounded by a radiolucent halo[4].

Compound odontomas are much more common than complex ones, with no gender predilection. Although they can be found in any region of the jaws, odontomas are more frequent in the maxilla than in the mandible[4,5].

Odontomas are usually detected in the second decade of life, often when they cause impaction of permanent teeth; failure of eruption of primary teeth secondary to an odontoma is a rare occurrence[6]. Although clinically slow-growing and asymptomatic, these lesions can give rise to aesthetic and functional complications. They are usually diagnosed through routine radiographic examination or when investigating other events, such as delayed exfoliation of primary teeth, ectopic eruption, and impaction of permanent teeth[3].

Although odontomas have no defined cause, genetic or local issues such as trauma, infections, or pressure at the site are the most commonly implicated etiological factors[7]. Treatment of these tumors is based on complete surgical resection. The prognosis is favorable, and recurrence is rare[6].

Within this context, the present report describes a case of primary tooth impaction caused by the presence of a compound odontoma in a 4-year-old patient. Management and follow-up are also discussed. The present study was approved by the Lutheran University of Brazil (ULBRA) Research Ethics Committee with opinion no. 2.523.646.

Case report

A 4-year, 10-month-old white male was brought by his parents to the specialist dental clinic of the ULBRA Pediatric Dentistry program in Canoas, Brazil. A thorough history revealed no systemic complaints; the reason for consultation, as reported by the parents, was a "missing tooth" in the anterior region of the lower arch.

Extraoral examination was noncontributory. Intraoral examination revealed absence of the primary left mandibular lateral incisor (#72). There were no carious lesions.

An orthopantomogram showed intraosseous retention of the missing tooth in the alveolar ridge and the presence of small, radiopaque structures adjacent to the crown of the tooth, consistent with a compound odontoma. At this time, the permanent mandibular central incisors (#31 and #41) were found to be in the terminal stage of crown formation (Figure 1). Thus, the parents were instructed as to the optimal timing of surgery, i.e., around the time of eruption of the permanent mandibular incisors, once root formation of these teeth had advanced further.

Figure 1 – Orthopantomogram obtained at age 4 years 10 months, showing failure of eruption of the primary left mandibular lateral incisor and small, radiopaque structures in the region of the affected tooth

Source: the authors (Ulbra-Canoas, RS, Brazil).

The patient was recalled periodically, and a new orthopantomogram was performed at age 6 years, 6 months. The primary right mandibular central incisor had exfoliated, and its permanent successor was in the active phase of eruption, with one-third of the root formed. Tooth #72 was still retained, and the overlying odontoma continued to prevent eruption of its permanent successor (Figure 2).

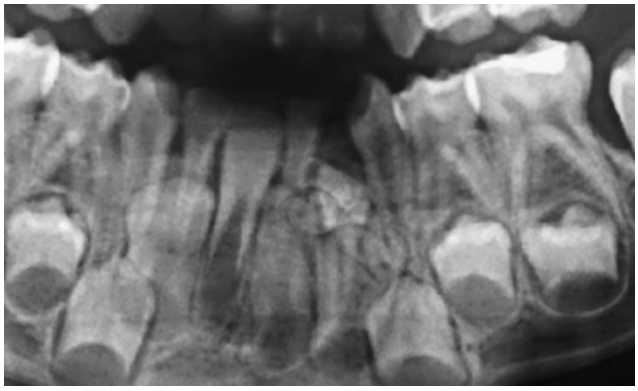

Figure 2 – Orthopantomogram obtained at age 6 years 6 months, showing radiopaque areas in the region of the permanent mandibular incisors on the left and in the apical third of the adjacent canine, with retention of tooth #72

Source: the authors (Ulbra-Canoas, RS, Brazil).

The decision was made to operate, and a cone-beam computed tomography (CBCT) scan was performed. The scan showed a hyperdense mass consisting of a cluster of denticles located lingual to #72, at the level of the alveolar ridge, consistent with a compound odontoma in the region of the permanent left mandibular lateral incisor (Figure 3).

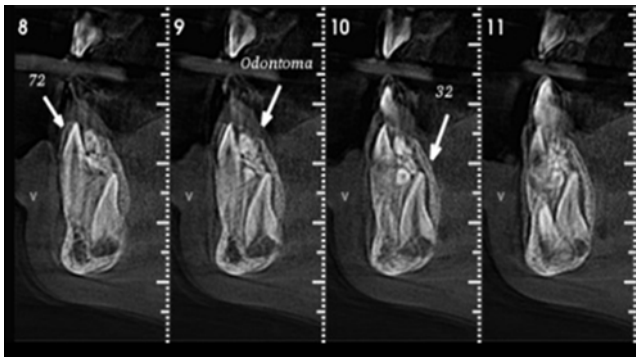

Figure 3 – Sagittal cone-beam CT slice showing a compound odontoma lingual to tooth #72 and vestibular to the crown of #32. Both teeth are unerupted

Source: the authors (Ulbra-Canoas, RS, Brazil).

The patient was hospitalized for surgery under general anesthesia, given his young age and the complexity of the procedure. Tooth #71 was extracted and access to #72 was established. The compound odontoma was resected, while avoiding contact with the adjacent permanent teeth (Figure 4).

Figure 4 – Resected fragments of tooth-like structures, macroscopically characteristic of a compound odontoma

Source: the authors (Ulbra-Canoas, RS, Brazil).

The surgical specimen was stored in 10% neutral buffered formalin solution for 24 hours and sent for processing and histopathological examination. Histological sections showed fibrous connective tissue with areas of hyperemia, edema, and hemorrhage. In some regions, columnar and cubic epithelial tissue covering a potential space was observed. In addition, a fragment of dental tissue (consisting of enamel matrix, dentin, and pulp tissue arranged in an organized manner) and loose connective tissues were seen. The diagnostic hypothesis of a compound odontoma was thus confirmed histologically (Figure 5).

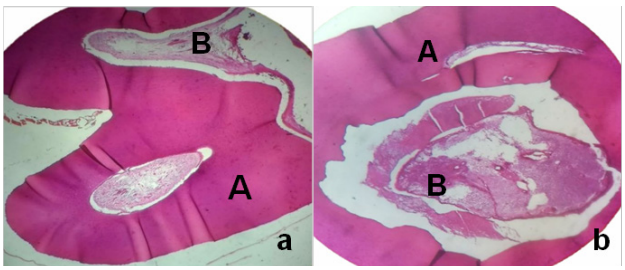

Figure 5 – Histological section of compound odontoma – (A) dentin; (B) pulp tissue (A - 40x and B – 100x; light microscopy; descalcification technique; H&E - hematoxylin eosin)

Source: the authors (Ulbra-Canoas, RS, Brazil).

One week after the surgical procedure, the patient returned for a postoperative clinical evaluation without any complications, pain or edema. Six months later, at age 7 years 3 months, the patient returned for clinical and radiographic follow-up. There was radiographic evidence of healing of the surgical site. One-third of the crown of tooth #31 was visible on intraoral examination (Figure 6).

Figure 6 – Onset of eruption of the permanent mandibular central incisor, with rotation and lack of space for the adjacent mandibular lateral incisor – the permanent left maxillary central incisor exhibits macrodontia

Source: the authors (Ulbra-Canoas, RS, Brazil).

The patient was last seen at age 8 years (Figures 7 and 8). The permanent mandibular central incisors had erupted, as had the maxillary central incisors, with crowding of the anterior region. The permanent left maxillary central incisor had an enlarged crown, consistent with macrodontia. The patient was thus referred for orthodontic evaluation and management.

Figure 7 – Patient at age 8 years, with macrodontia of the permanent left maxillary central incisor and no other evident dental malformations

Source: the authors (Ulbra-Canoas, RS, Brazil).

Figure 8 – Patient at age 8 years, with macrodontia and crowding in the anterior region of both arches

Source: the authors (Ulbra-Canoas, RS, Brazil).

Discussion

The present case report described the diagnosis and management of a mandibular compound odontoma in a 4-year-old male patient. The low frequency of odontomas in mandibular bone[4,5] and their very low prevalence in the primary dentition[1] highlight the rarity of this case.

A thorough clinical history failed to disclose any trauma or infection that could have precipitated the odontoma; thus, a genetic etiology was suspected.

In this patient, the presence of a compound odontoma in the mandibular region caused impaction of a primary incisor, with delayed root resorption and failure of its permanent successor to erupt. In a retrospective study, Isola et al.[9] (2017) confirmed the association between delayed eruption (with consequent impaction of permanent teeth) and presence of odontoma.

Indeed, the presence of odontomas is one of the main causes of retained teeth, and, as they are often detected in the second decade of life (43.8% of odontomas occur in this age group)[1], impaction of permanent teeth and prolonged retention of primary teeth are most likely[6]. Impaction of primary teeth is an unusual event[10,11].

To aid in diagnosis, the imaging modality of choice was conventional panoramic radiography. Before surgery, a CBCT was also obtained for more accurate localization of the odontoma, thus allowing preservation of adjacent structures during resection. Preoperative CBCT is essential for this reason[12,13]. However, it bears stressing

that the risk of radiation exposure in children is be twice as high as in adults, as children are more susceptible to late effects of radiation because their cells are less differentiated[14]. Thus, additional caution is warranted when requesting imaging in children.

The initial radiographic diagnostic hypothesis of a compound odontoma was confirmed through clinical and histological examination. Histological slices showed a fragment of dental tissue consisting of enamel matrix, dentin, and pulp tissue arranged in an organized manner, all features consistent with odontomas[15].

The choice of optimal timing of surgical intervention for resection of an odontoma must take into account the stage of formation of the successor permanent tooth; at least 2/3 of root formation is preferred[16]. Evaluation of the extent of root formation is important to predict the risks of damage to the roots of teeth adjacent to the odontoma at the time of surgery. The presence of an open root apex on the impacted permanent tooth can contribute to more favorable outcomes at the time of orthodontic treatment[9]. However, some authors believe that early removal of the odontoma allows the impacted tooth to erupt, thus improving prognosis[11,17].

The age of the child should also be taken into account, as young children may find it difficult to cooperate with a surgical intervention[17]. In these cases, resection under general anesthesia is an option.

In this clinical case, considering the age of the child and the stage of development of the permanent teeth, the decision was made to conduct watchful waiting until the most appropriate opportunity for surgery presented itself. After 2 years of follow-up, tooth #31 was found to be in the early stage of root formation, and the surgical intervention could then be scheduled. Treatment of odontoma consists of its complete resection. The technique is the same as for extraction of a retained tooth. Prognosis is excellent, and recurrence is rare[18].

In the case reported herein, 6 months after complete resection of the compound odontoma, tooth #31 was already visible in the oral cavity, but eruption of #32 was prevented by crowding. Furthermore, tooth #21 exhibited an enlarged crown, characteristic of macrodontia. Garib et al.[8] (2010) suggest that dental anomalies of number, size, position, and eruption are often of genetic origin. There seems to be a genetic interrelation in determining some of these anomalies, considering their high rate of co-occurrence[8]: distinct certain dental anomalies often co-occur in the same patient at a frequency higher than would be expected at random. This is explained by the fact that a single genetic defect can cause multiple anomalies, including agenesis, microdontia, ectopic eruption, and developmental delay. To put it simply, one might say that a single “defective” or “mutant” gene can be expressed in different dental regions[19].

Conclusion

Odontomas are classified as benign odontogenic tumors of unknown etiology. Although they are generally asymptomatic and slow-growing, early diagnosis is essential. Radiographic examination is essential for diagnosis and localization of the lesion in relation to adjacent structures. If not diagnosed and resected, odontomas can lead to prolonged retention of primary teeth, impaction of permanent teeth, ectopic eruption, and occlusal and aesthetic disorders.

Treatment consisted of complete surgical resection of the odontoma, with care taken to ensure preservation of the adjacent structures and tooth germs. Long-term follow-up was established to ensure monitoring and correction of any abnormalities that might result from this pathology. Dental practitioners must be aware of anomalies such as those described in the present report. Proper diagnosis and treatment planning can ensure a favorable outcome in cases of odontoma.

Resumo

Objetivo: relatar um caso raro de impacção de um incisivo decíduo inferior pela presença de odontoma composto, bem como descrever a sua abordagem clínica. Relato de caso: paciente do sexo masculino, com 4 anos de idade, apresentava ausência do incisivo lateral decíduo inferior esquerdo. O exame radiográfico mostrou impacção

do incisivo não erupcionado próximo a estruturas radiopacas sugestivas de odontoma composto. O paciente foi acompanhado por dois anos, momento em que se realizou abordagem cirúrgica do caso. Após a cirurgia, a hipótese de diagnóstico de odontoma composto foi confirmada e com o acompanhamento ocorreu a erupção dos incisivos centrais permanentes inferiores. O paciente foi encaminhado para tratamento ortodôntico. Considerações finais: esse relato de caso aborda um caso raro de odontoma composto associado à não erupção de dente decíduo, uma vez que odontomas costumam ser detectados preferencialmente na segunda década de vida do paciente, sendo associados à impacção de dentes permanentes. Além disso, apresenta um protocolo de abordagem clínica para esses casos quando diagnosticados em idade precoce no paciente infantil.

Palavras-chave: Odontoma. Dente decíduo. Dente impactado.

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