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Pediatric anterior mandible compound odontoma: review of the literature and illustrated clinical case

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Abstract

Odontomas are benign odontogenic tumors resulting from developmental defects in dental tissues. They are categorized into two types: complex odontomas, composed of disorganized dental tissue masses, and compound odontomas, characterized by multiple, tooth-like structures. This case report describes an unusual instance of a compound odontoma in the anterior mandible of a 7-year-old male, detected incidentally during a routine dental check-up. Radiographic imaging, including panoramic X-ray and CBCT, revealed a hyperdense, tooth-like mass in the anterior left mandible. The lesion was surgically removed under general anesthesia, resulting in the extraction of 56 denticles. Postoperative recovery was uneventful, and no recurrence was observed. Although odontomas are generally asymptomatic, early detection and timely surgical intervention are crucial to prevent complications such as impacted teeth. The prognosis is typically favorable, with a low risk of recurrence.

Keywords: anterior mandible, complex odontoma, compound odontoma, odontogenic tumor, odontoma

Introduction

Odontomas constitute a developmental defect of hard dental tissues and are classified as benign odontogenic tumors affecting the odontogenic epithelium with odontogenic ectomesenchyme [1, 2]. They are composed of all dental structures and tissues: enamel, dentin, cementum, and pulp [1, 2]. Two types of odontomas have been differentiated: complex and compound, according to World Health Organization (WHO) 5th classification of head and neck tumors [1, 2]. The complex odontomas are characterized by amorphous masses of dental tissues, while compound odontomas are defined as multiple, well-formed tooth-like structures [1]. Odontomas are slowly and asymptomatic growing and might be associated with retention of delay in the eruption of primary and permanent teeth [1]. The etiology of odontomas remain unknows, although local trauma, infection, and genetic factors have been suggested [1]. This case report presents an unusual case of compound odontoma in the anterior mandible of a young child.

Materials and methods

For our review of the literature we applied the following search equation in PubMed database:

Search: **compound odontoma anterior mandible**
("odontoma"[MeSH Terms] OR "odontoma"[All Fields] OR ("compound"[All Fields] AND "odontoma"[All Fields]) OR "compound odontoma"[All Fields]) AND ("anterior"[All Fields] OR "anteriores"[All Fields] OR "anteriorization"[All Fields] OR "anteriorized"[All Fields] OR "anteriors"[All Fields]) AND ("mandible"[MeSH Terms] OR "mandible"[All Fields] OR "mandibles"[All Fields] OR "mandibles"[All Fields])
Translations
compound odontoma: "odontoma"[MeSH Terms] OR "odontoma"[All Fields] OR ("compound"[All Fields] AND "odontoma"[All Fields]) OR "compound odontoma"[All Fields]
anterior: "anterior"[All Fields] OR "anteriores"[All Fields] OR "anteriorization"[All Fields] OR "anteriorized"[All Fields] OR "anteriors"[All Fields]
mandible: "mandible"[MeSH Terms] OR "mandible"[All Fields] OR "mandibles"[All Fields] OR "mandible's"[All Fields]

The selected languages were English and French. The inclusion criteria were: compound odontoma, anterior mandible, case report, information on the age and on the number of extracted denticles, pediatric population.
The exclusion criteria were: complex odontoma, posterior mandible, erupted

odontoma, no information on the age and on the number of extracted denticles, adult population.
We found 42 articles. After application of inclusion/exclusion criteria we found only 2 articles [3, 4] corresponding to our search.
With additional manual search through the selected references, we found also 2 more articles [5, 6]

Case report

A 7-year-old male was referred by his dentist to the Department of Oral and Maxillofacial Surgery at CHU UCL Namur, Belgium, following the discovery of a lesion in the anterior left mandible during a routine dental check-up. Neither the patient nor the parents could recall any history of pain or swelling in the area.
Patient's medical history revealed a glucose-6-phosphate dehydrogenase (G6PD) deficiency. This – is an X-linked recessive disorder more frequently present in male patients. The G6PD deficiency can cause hemolytic anemia. There was no history of trauma or infection in the mandible. An oral examination showed mixed dentition with no signs of decay; all deciduous teeth and first permanent molars were present. There was noticeable buccal alveolar bone enlargement, though the overlying mucosa appeared normal and intact, with no involvement of the lingual side (Figure 1).

Fig. 1. Intraoral scan of anterior maxilla and mandible. White arrow showing left vestibular alveolar bone enlargement between teeth n°73 and n°74.

A panoramic X-ray showed multiple radio-opaque tooth-like structures between the roots apex of teeth n°73 and n°74 (Figure 2).

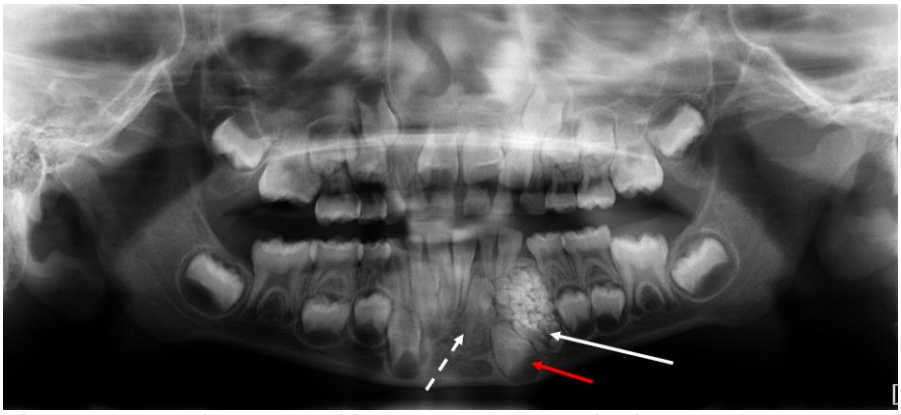

Fig. 2. Panoramic X-ray. White arrow: compound odontoma between teeth n°73 and n°74. Eruption delay of tooth n°32 compared to tooth n°42 (white dashed arrow). Eruption delay of tooth n°33 compared to tooth n°43 due to the odontoma obstacle on the eruption pathway (red arrow). Superimposition of the compound odontoma on the apex of the root of tooth n°73.

Cone-beam computed tomography (CBCT) was performed (Figure 3), revealing a hyperdense, tooth-like mass in the left anterior mandible, surrounded by a radiolucent border. The CBCT demonstrated also the expansion of vestibular cortical bone, which remained intact but was very thin. These findings led to a diagnosis of compound odontoma.

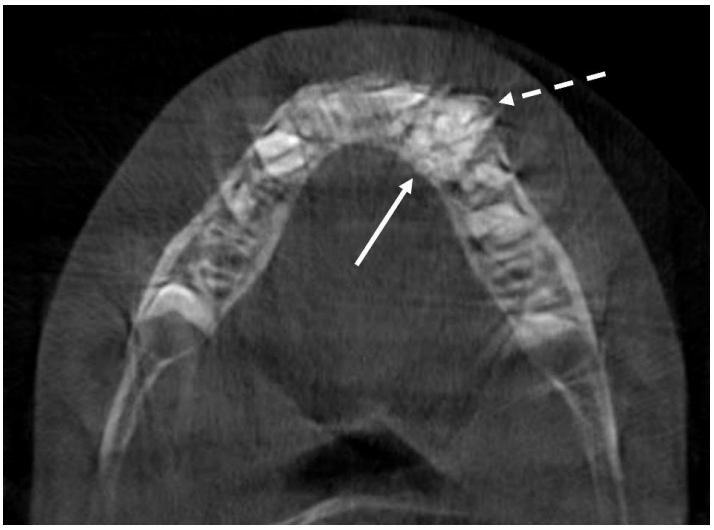

Fig. 3. Cone beam computed tomography of the mandible. White arrow: compound odontoma. Dashed arrow: vestibular expansion of the lesion. The image is of lower quality due to movement artifact.

The lesion was surgically removed under general anesthesia through an intra-oral approach (Figures 4-7). A mucoperiosteal flap was raised between teeth n°75 and n°83 to expose the underlying bone. The adjacent teeth to the odontoma were pushed back by the odontoma but remained intact.

Fig. 4. Intraoperative view. Arrow showing vestibular cortical bone expansion without bone perforation.

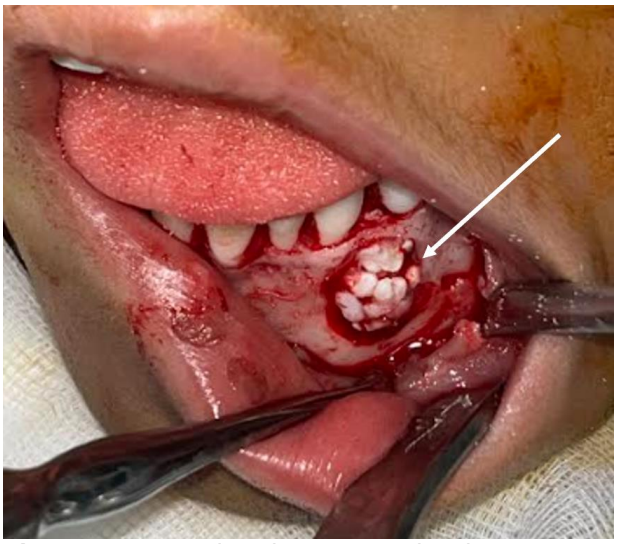

Fig. 5. Intraoperative view. Arrow showing compound odontoma and multiple denticles after vestibular cortical bone removal.

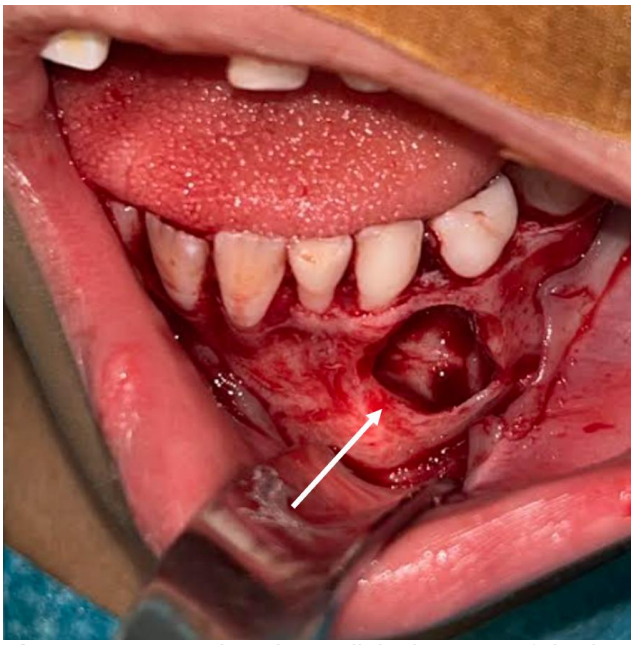

Fig. 6. Intraoperative view. Clinical aspect of the bone defect after complete removal of the entire odontoma (arrow).

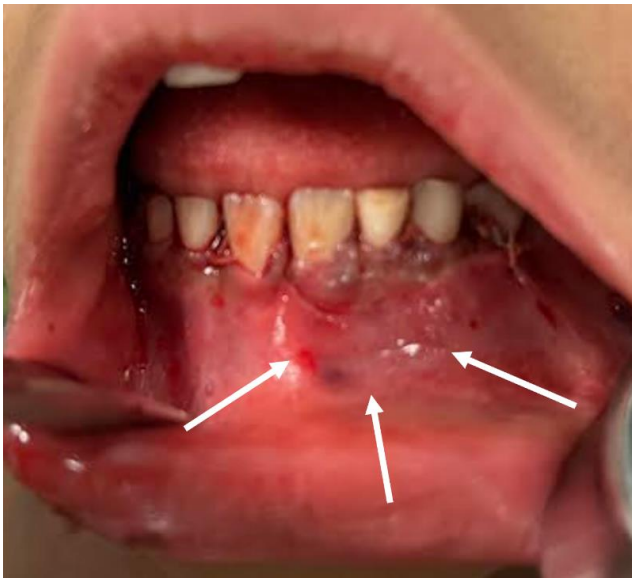

Fig. 7. Surgical site closure. Arrows showing the postoperative area.

A total of 56 denticles of varying sizes and shapes were removed (Figure 8).

Fig. 8. The content of compound odontoma consisted of 56 denticles.

After thorough irrigation and curettage of the enucleated site, the intact mucoperiosteal flap was repositioned and sutured with 3/0 Vicryl. Postoperative medication included antibiotic, painkiller, non-steroidal anti-inflammatory drug and mouthwash. The patient was also advised to consume soft foods for a month. Histopathological analysis confirmed the diagnosis of compound odontoma. Seven days post-surgery, the wound was reported to be healing well. Two months follow-up panoramic X-ray (Figure 8) confirmed proper bone healing, with no signs of recurrence.

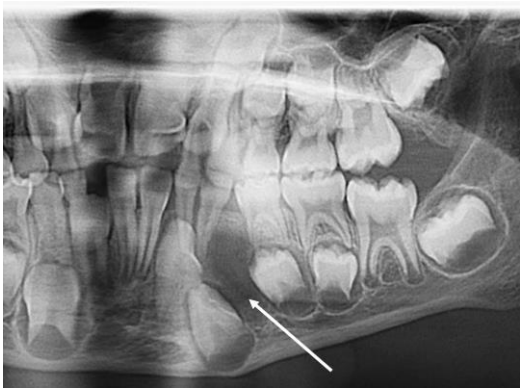

Fig. 9. Two months postoperative panoramic X-ray. Arrow showing bone healing area without recurrence. The root of the tooth n°73 is visible with slight external resorption.

Discussion

Odontoma are benign tumors commonly found in oral pathology and are recognized as the most prevalent odontogenic tumors [1]. These tumors are hamartomatous developmental malformations of dental tissues [1]. There are two main types: complex odontomas, which consist of disorganized clusters of dentin and enamel (sometimes with cementum), and compound odontomas, which form multiple, small, tooth-like structures called denticles [1]. The clinical case presented here involved a compound odontoma.

The exact etiology of odontomas remains unclear, though several factors have been implicated in their development. These include trauma during the primary dentition period, hereditary conditions such as Gardner's syndrome, hyperactivity of odontoblasts, and genetic mutations affecting dental development [7]. However, we don't find in the medical literature a relationship between G6DP deficiency and the presence of odontoma.

Odontomas can be diagnosed at any age but are most identified during the second decade of life [1]. It has been reported that compound odontomas are diagnosed at an earlier age than complex odontomas which was the case in our clinical case [7].

Although there is no clear consensus on gender predilection, some studies suggest a slight male predominance for compound odontomas, while complex odontomas appear slightly more frequently in females [7].

The incidence of odontomas is low in African populations, whereas they constitute the majority of odontogenic tumors in North America. This discrepancy may be due to limited resources for detecting asymptomatic cases in certain countries.

The preferred localization of compound odontomas is the anterior maxilla, in the canine area [1] while posterior mandible has been reported to be the most common location for the complex odontoma [4]. The compound odontoma in this case was discovered in the anterior mandible, which is an uncommon site for this type of lesion. In the case report by Chiranjeevi & Prabhuraj, the authors described a 15-years old female patient with asymptomatic compound odontoma in the anterior mandible and found in situ 156 denticles [3].

In the article by Mazur et al., [6] the case n°2 presents with the anterior mandible odontoma in a 14-years old male patient. There exists no information in the article about the number of extracted denticles. Looking at the Figure 8C [6] there are less than 20 extracted denticles associated with the extracted canine n°33.

Van Trung Hoang et al., presents 13-years old asymptomatic male patient, without previous trauma story [5]. The giant compound odontoma was found on panoramic X-ray between teeth n°45 and n°83. The presence of massive odontoma caused a deep impaction of the canine n°43 [5]. The removal of compound odontoma consisted of more than 100 denticles and of the deeply impacted canine [5].

In the case report by Uma [4], the author reports a case of a 9-years old female patient with compound odontoma in anterior mandible with 9 denticles.

Our clinical case describes the youngest patient with the compound odontoma in the anterior mandible comparatively to the selected literature on this topic [3-6]. We found also the biggest collection of denticles in the anterior mandible under the age of 10 years.

Odontomas are often asymptomatic and are typically discovered incidentally through radiographic imaging conducted for other reasons, such as disrupted tooth eruption or dental anomalies related to malocclusion [1, 3]. In this case, the lesion was identified during a routine dental check-up, with no occlusal issues reported.
Early diagnosis is especially important for the odontoma located around the maxillo-mandibular incisors, due to the aesthetic, phonetic, and functional demands of this area [7].
While generally asymptomatic, compound odontomas can sometimes cause pain and swelling [3]. Although an impacted tooth is sometimes associated with odontomas [5], this was not observed in our patient. However, we found a slight eruption delay of teeth n°32 and n°33 compared to teeth n°42 and n°43 due to the obstacle on the eruption pathway (Figure 2).
Despite potentially interfering with tooth eruption (Figure 2), odontomas typically do not cause resorption of adjacent tooth roots (Figure 8). A clear peripheral halo around the lesion is also common. In some cases, compound odontomas may be multiple, necessitating an investigation for associated conditions such as Gardner's syndrome [7]. The number of denticles removed during enucleation of odontomas varies [4].
Surgical removal via simple enucleation is the standard treatment [7]. Early detection and surgical enucleation, followed by curettage, are recommended to prevent complications [7].

Differential diagnosis includes other ossified bone lesions, such as ossifying fibroma, odontoameloblastoma, ameloblastic fibroma, fibro-odontoma, osteoma, fibrous dysplasia, and florid osseous dysplasia [7].
Overall, the prognosis for these tumors is highly favorable, with a low risk of recurrence [1, 7].
The present case reported an asymptomatic compound odontoma in anterior mandible in a 7-year-old male patient. The lesion was diagnosed in a routine check-up following radiographic examinations and treated by simple enucleation under general anesthesia. The surgery led to the extraction of 56 denticles. Although odontomas are benign and generally asymptomatic, early detection and surgical intervention are necessary to present complications like impacted teeth. The prognosis is favorable, with a low risk of recurrence.

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- **Ethical approval**: There was no need for an ethical approval for this case report
- **Informed consent**: There was no need for the informed consent for this case report as all the images were anonymized and no private data were provided allowing the patient's identification

Authors contribution:

Author	Contributor role
Petit Laura	Conceptualization, Methodology, Formal analysis, Visualization, Writing original draft preparation,Writing review and editing
Dumoulin Sarah	Conceptualization, Writing review and editing
Olszewski Raphael	Methodology, Visualization, Supervision, Writing original draft preparation,Writing review and editing

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