

Silent architects of the jaw: A case series on odontome

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ABSTRACT

Odontomes are the most common benign odontogenic tumors of the jaw, which are usually slow-growing and non-aggressive. They are generally asymptomatic and diagnosed during routine radiographic investigations and are mostly associated with tooth eruption disturbances. Here, in this case series, we report six cases of compound and composite odontoma, with a relevant review of the literature. The present case series report covers cases of odontomes with an age group varying from 20 to 70 years, discussing clinical and radiographic features along with a brief review of the literature.

Key words: Benign odontogenic tumors, Complex composite odontoma, Compound composite odontoma, Hamartoma

The term odontome in the field of dentistry was initially coined for any tumor or tumor-like lesion or neoplastic cyst that originates from cells of odontogenic tissues [1]. Odontomas are grouped under the category of benign mixed (epithelial and mesenchymal) odontogenic tumors. Odontomas, previously thought to be developmental disturbances, are now considered hamartomas because of their origin in the odontogenic epithelium, and they comprise both odontogenic hard and soft tissues. Odontomas are the second most common odontogenic tumors in incidence after ameloblastoma [2]. According to the World Health Organization (WHO), odontomas are classified into two types: Compound odontomas and complex odontomas. Compound odontomas consist of multiple small tooth-like structures, while complex odontomas are characterized by a disorganized mass of dental tissues [3]. Multiple odontomas are associated with cleidocranial dysostosis, Gardner's syndrome, etc.[4]

The purpose of this case series is to present the cases of different odontomas as an incidental finding. The types of odontoma, etiology, classification, clinical features, radiographic appearance, clinical presentation, histological features, and treatment options were discussed.

CASE SERIES

Case 1: Compound Odontoma of the Anterior Maxilla

A 29-year-old female patient reported to the department of oral medicine and radiology with a chief complaint

of pain in the upper right back tooth region for the past 5–6 months. The pain was described as intermittent and dull in nature with no aggravating and relieving factors. On intraoral examination, mild tenderness in relation to the maxillary right posterior teeth was observed. No obvious swelling or sinus tract was observed; root stumps were present with respect to 63 (retained deciduous root stumps). An orthopantomogram (OPG) showed a malpositioned tooth, which is mesially tilted in relation to the long axis of the adjacent tooth wrt 18. An incidental finding of a well-defined radiopaque mass with a thin radiolucent rim exhibiting a tooth-like structure in the maxillary left front region associated with an unerupted, horizontally placed canine was observed. Based on radiographic findings, a diagnosis of compound composite odontoma was established (Fig. 1).

Case 2: Complex Odontoma of the Anterior Mandible

A 24-year-old male patient reported to the department of oral medicine and radiology with a chief complaint of dirty teeth for several months. The patient expressed concern regarding discoloration and deposits on teeth. Medical and dental history were non-contributory. The patient had a history of adverse oral habits including tobacco chewing 1 packet/day for 2 years and smoking 1–2 cigarettes/day for 2 years. On intraoral examination, generalized extrinsic stains were present; tooth 43 was clinically missing, and a supernumerary tooth was present between 11 and 21. No associated swelling or discharge was noted. OPG shows an incidental finding of

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a well-defined homogenous irregular shaped radiopaque mass observed in the anterior mandible region just below the apex of root wrt 33 (Fig. 2). An unerupted tooth was malpositioned wrt 43, and a mesiodens was observed in the anterior maxilla. Based on radiographic findings, a diagnosis of impacted canine wrt 43, mesiodens, complex composite odontoma of the anterior mandible was established.

Case 3: Compound Odontoma of the Anterior Maxilla

A 48-year-old male patient reported to the department of oral medicine and radiology with a chief complaint of mobility of a tooth in the lower front tooth region for 5–6 years, associated with pain and bleeding gums. On intraoral examination, grade 3 mobility was observed wrt 43 and missing teeth wrt 27, 28, 16, 17, 32, 31, 41, 42. OPG shows an incidental finding of a well-defined homogenous irregular shaped, tooth-like radiopaque mass observed in the left anterior maxilla region with an unerupted congenitally missing canine wrt 23 (Fig. 3). Based on radiographic findings, a diagnosis of compound composite odontoma of the anterior left maxilla was established.

Case 4: Complex Odontome of the Left Posterior Mandible

A 67-year-old male patient reported to the department of oral medicine and radiology with a chief complaint of pain in the upper right back tooth region for 2–3 months. On intraoral examination, root stumps were observed wrt 24, 27, 28, 47. OPG shows an incidental finding of an irregular radiopaque mass near the crest of the alveolar ridge in region wrt 38 (Fig. 4). Based on radiographic findings, a diagnosis of complex composite odontoma of the anterior left mandible was established.

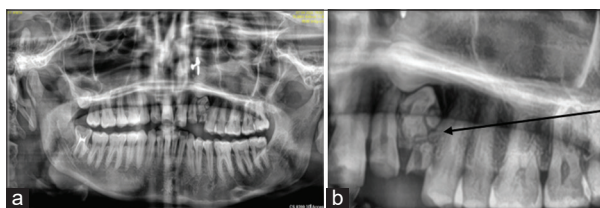


Figure 1: (a) Orthopantomogram (OPG) of the patient; (b) OPG showing odontome with retained deciduous canine (case 1)

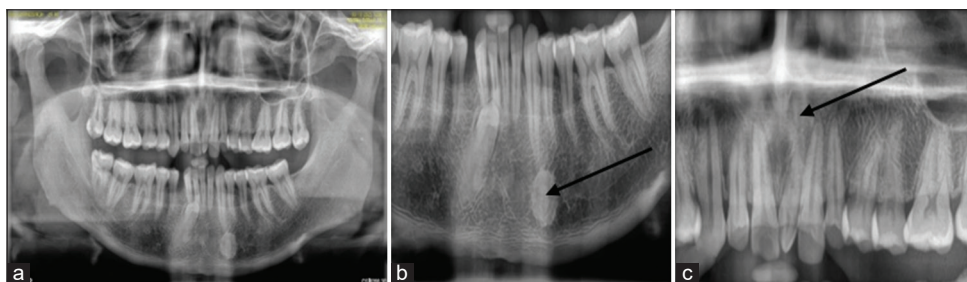


Figure 2: (a) Orthopantomogram (OPG); (b) OPG showing odontome; (c) OPG showing mesiodens (case 2)

Case 5: Complex Odontome of the Left Posterior Mandible

A 55-year-old male patient reported to the department of oral medicine and radiology with a chief complaint of missing teeth for 1–2 months. On intraoral examination, an edentulous space was observed wrt 16, 15, 13, 12, 11, 21, 22, 23, 24, 25, 26, 27, 36, 31, 32, 41, 42, 43, 44, 45, 46, 47. OPG shows an incidental finding of irregular radiopaque mass below the crest of alveolar ridge in region wrt 45 (Fig. 5). Based on radiographic findings, a diagnosis of complex composite odontoma of the anterior right mandible was established.

Case 6: Compound Odontome of the Right Anterior Maxilla

A 49-year-old male patient reported to the department of oral medicine and radiology with a chief complaint of pain in the upper left back tooth region. On intraoral examination, teeth 13 and 34 were missing. OPG shows an incidental finding of a radiopaque mass with tooth-like structure in region wrt 13 (Fig. 6). Based on radiographic findings, a diagnosis of compound composite odontoma of the anterior right maxilla was established.

DISCUSSION

Shafer *et al.* explained that odontomes are tumors of odontogenic origin, but now they are widely accepted as hamartomas by most researchers. Odontome was coined by Paul Broca in the year 1867, and he proposed that they are formed by overgrowth or transformation of complete dental tissue. The WHO (2005) classified the odontome as a complex and compound composite odontome. They are classified based on gross and radiographic features into compound, which resemble small tooth-like structures and complex type, which is a conglomeration of enamel, dentin, and cementum [1,4,5].

Compound odontomes are more common than complex types, with a ratio of 1:2. Compound odontomes are usually seen between teeth, while complex odontomes are observed in posterior jaws as conglomerate masses, but both are composed of enamel matrix, dentin, cementum, and dental pulp surrounded by a dental follicle or cyst. With regard to the occurrence of

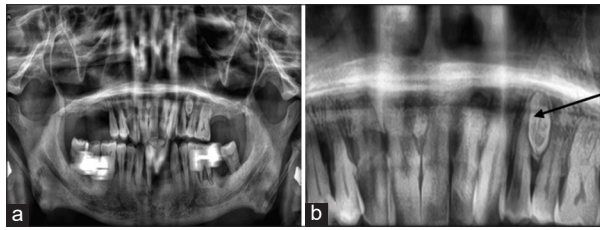


Figure 3: (a) Orthopantomogram (OPG); (b) OPG showing odontome (case 3)

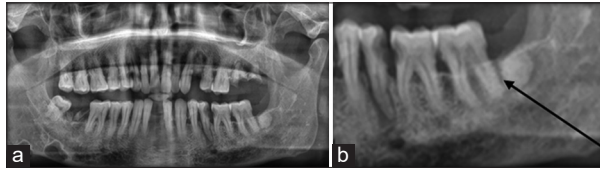


Figure 4: (a) Orthopantomogram (OPG); (b) OPG showing odontome (case 4)

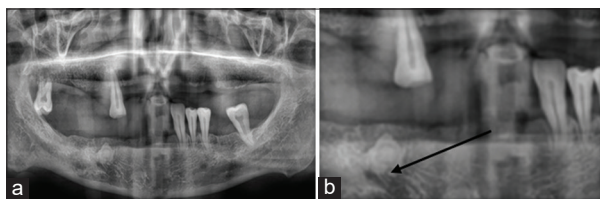


Figure 5: (a) Orthopantomogram (OPG); (b) OPG showing odontome (case 5)

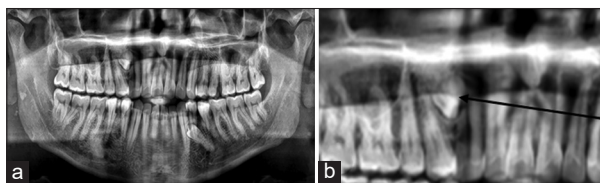


Figure 6: (a) Orthopantomogram (OPG); (b) OPG showing odontome (case 6)

odontomes, the compound odontome is predominantly seen in the anterior jaw segment (61%), and the complex odontomes are usually seen in the posterior segment [6]. Odontomas do not show any significant relationship with sex, but a few studies mentioned the female predominance compared to males [2]. Odontomas are considered a type of odontogenic hamartoma and are generally reported not to exceed 3 cm in diameter. Some authors have referred to odontomas with a diameter exceeding 3 cm as giant odontomas. As hamartomas, giant odontomas generally show no signs or symptoms, but if they perforate the mucosa to become exposed in the oral cavity, oral and maxillofacial infections can result. Surgical removal and a histopathological examination may also be required to differentiate them from osteomas, cemento-osseous dysplasia (COD), or mixed odontogenic tumors [7,8].

The etiology of odontomes is not fully understood, but several theories have been proposed to explain their development. One of the most widely accepted theories is the “developmental anomaly” theory, which suggests that odontomes result from disturbances in the development of dental tissues. According to this theory, odontomes occur when the normal process of tooth formation is interrupted, resulting in the formation of abnormal dental

tissues [3]. In addition to this, the theory is supported by the fact that odontomes are often associated with other developmental anomalies, such as impacted teeth, supernumerary teeth, and tooth agenesis [7]. Another theory that has been proposed is the “genetic” theory, which suggests that odontomes are inherited in an autosomal dominant manner. Several studies have reported familial cases of odontomes, supporting this theory. However, the exact genetic mechanism underlying the development of odontomes is still unknown [3]. A third theory that has been proposed is the “trauma-induced” theory, which suggests that odontomes result from trauma to the dental tissues. According to this theory, trauma can cause the dental epithelium and/or mesenchyme to proliferate abnormally, resulting in the formation of odontomes. This theory is supported by the fact that odontomes are often found in teeth that have been traumatized [3]. In addition to these theories, several factors have been identified that may increase the risk of developing odontomes. These include radiation exposure, certain medical conditions such as Gardner syndrome, and exposure to certain chemicals such as asbestos [8]. Overall, the etiology of odontomes is complex and multifactorial. Further research is needed to fully understand the underlying mechanisms involved in their development. However, the developmental anomaly theory remains the most widely accepted explanation for the formation of odontomes.

The WHO classifies odontomes into two types, compound and complex odontomes (Table 1) [9]. Compound odontomes are composed of multiple, small, tooth-like structures resembling normal teeth in size and shape. These structures are arranged in a radiating pattern around a central core of dental pulp. Complex odontomes are composed of an irregular mass of dental tissues and can include structures resembling normal teeth, such as enamel, dentin, and cementum, as well as structures not normally found in teeth, such as bone, cartilage, and fibrous tissue [3]. Based on this classification, in the first, third, and sixth cases, the odontome found was classified into a compound odontome, and in the second, fourth, and fifth cases, it was diagnosed as a complex odontome. Previous studies have shown that compound odontomas are mainly found in the anterior maxillary area, while complex odontomas are found in the posterior mandibular area [10].

Most odontomes are asymptomatic and are discovered incidentally on routine dental radiographs. However, large odontomes can cause facial asymmetry, delayed eruption of teeth, displacement of adjacent teeth, or bone expansion. In rare cases, odontomes can cause pain, swelling, and infection [3]. In all six cases, odontomas were completely asymptomatic and found accidentally on radiographic examination.

The radiographic appearance of odontomas varies depending on their type. Odontomes are usually detected on routine radiographic examinations as well-circumscribed radiopaque masses. The radiographic

Table 1: Difference between compound and complex odontome

Feature	Compound odontome	Complex odontome
Definition	Malformation with all dental tissues arranged in an orderly pattern, forming multiple tooth-like structures (denticles)	Malformation with all dental tissues present but arranged in a disorganized pattern
Shape	Regularly shaped; multiple small denticles	Amorphous, irregular mass
Appearance	Tooth-like structures resembling normal teeth	Irregular calcified mass with no resemblance to teeth
Composition	Enamel, dentin, cementum, and pulp in organized form	Same tissues present but in haphazard arrangement
Incidence	~9–37%	~5–30%
Sex predilection	Slight female predominance	Slight female predominance
Age	Common in 2 nd –3 rd decade; younger patients	Same (2 nd –3 rd decade)
Classification	Denticular type - Particulate type - Denticulo-particulate type	Not subclassified; appears as a single mass
Site predilection	Anterior maxilla (incisor–canine region)	Posterior mandible (molar region)
Symptoms	Unerrupted/impacted teeth, retained deciduous teeth, mild swelling, displacement	Similar, but more likely to cause bony expansion
Radiographic features	Multiple tooth-like radiopacities (denticles) surrounded by a radiolucent rim	Single irregular radiopaque mass with a thin radiolucent border
Histopathology	Organized tooth-like structures with pulp core, dentin, and enamel	Disorganized mass of enamel, dentin, cementum, and pulp
Treatment	Surgical excision	Surgical excision

appearance of each type is distinct [3]. The radiopacity of an odontoma depends on its developmental stage and degree of mineralization. In the first stage, the odontoma is radiolucent due to the lack of calcification. In the intermediate stage, slight radiopacity is seen as a result of partial calcification, while in the third stage, radiopacity is increased, with the mass surrounded by a radiolucent rim [11]. Compound odontomes typically appear as radiopaque masses with a radiolucent rim on intraoral periapical radiographs. They can resemble normal teeth in size, shape, and location and may even displace adjacent teeth. They often have a lobulated appearance with small radiolucent spaces within the radiopaque mass, giving them a “cluster of grapes” appearance [3]. The small, tooth-like structures within the compound odontome can also be seen as separate entities in the surrounding radiolucent zone. In some cases, compound odontomes can be completely radiopaque, making them difficult to distinguish from other radiopaque structures such as impacted teeth or calculus [6]. Complex odontomes, on the other hand, appear as irregular masses of calcified tissue with a radiopaque or mixed radiopaque and radiolucent appearance. They can vary in size from small nodules to large masses and are often located in the posterior mandible. They can cause cortical expansion and displacement of adjacent teeth and may be associated with cystic changes. In some cases, the complex odontome may appear as a diffuse radiopacity without any discernible shape or borders [6].

Based on the radiolucent rim around the radiopaque mass on the radiograph, the differential diagnoses considered included osteoma and COD. Other mixed odontogenic tumors such as ameloblastic fibro-odontoma or ontoameloblastoma, which grow aggressively, were also considered [11–13]. Ameloblastic fibro-odontomas present as well-demarcated radiolucencies containing

radiopaque material and usually occur in patients younger than 20 years of age [11]. Odontoameloblastomas, in contrast, are characterized by multilocular radiolucent lesions with radiopaque areas resembling dental tissue, and also predominantly affect patients younger than 20 years of age. The main difference between complex odontomas and mixed odontogenic tumors is their growth potential, as exemplified by the fact that even an ontoameloblastoma can cause root resorption of the adjacent teeth [11].

The treatment of odontomas is generally conservative, and surgical removal is often unnecessary. However, if the odontoma is causing symptoms or interfering with the eruption of adjacent teeth, surgical removal may be indicated. However, the surgical approach may vary depending on the type and location of the odontome [3]. The prognosis of odontomes is excellent with a low recurrence rate after surgical excision [11].

CONCLUSION

Odontomes are the most common odontogenic hamartomas and are usually detected incidentally during routine radiographic examination or in association with delayed eruption, retained deciduous teeth, swelling, or impacted teeth. This case series highlights the varied clinical and radiographic presentations of odontomes, emphasizing the importance of careful clinical evaluation and radiographic interpretation for early diagnosis. Both compound and complex odontomes demonstrated characteristic radiographic appearances, aiding in differential diagnosis from other mixed radiopaque lesions of the jaws. Early detection plays a significant role in preventing complications such as eruption disturbances, malocclusion, cystic transformation, and displacement of adjacent teeth.

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