

**Complex Odontoma of the Mandible Mimicking an Osteoma: A Case Report**

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**Abstract**

An odontoma is a benign tumour containing all the various component tissues of the teeth. It is the most common odontogenic tumour. According to the World Health Organization classification, two distinct types of odontomas are acknowledged; complex and compound odontomas. In complex odontomas, all dental tissues are formed, but appear without an organized structure. In compound odontomas, all dental tissues are arranged in teeth-like structures known as denticles. The etiology of an odontoma is unknown. Generally, development of an odontoma has been associated with traumatic dental

injuries sustained during primary dentition, as well as with inflammatory and infectious processes. Conservative surgical excision is the treatment of choice.

This report presents a case of an unusually shaped complex odontoma, clinically mimicking a bone forming tumour: An osteoma, located in the right posterior region of the mandible of a 13 year old female patient.

**Keywords:** Compound complex odontoma; Odontogenic tumour; Hamartoma; Ameloblastic fibro-odontoma; Osteoma

## Introduction

An odontoma is a benign, slow-growing odontogenic tumour, showing non-aggressive behaviour. Odontomas constitute 22% of all odontogenic tumours<sup>1, 2</sup>. The term odontoma was first used in 1967 by Paul Broca to describe all the odontogenic tumours<sup>3</sup>. He defined it as a tumour formed by an overgrowth of complete dental tissues<sup>4</sup>. In 1974, Shafer, Hine and Levy described odontomas as tumours of odontogenic origin, but their current view support an odontoma as a hamartoma and is now widely accepted by most authorities. In a broad sense, it means a growth with both the epithelial and mesenchymal components exhibiting complete differentiation, resulting in functional ameloblasts and odontoblasts<sup>5</sup>. These cells in turn form variable amounts of enamel and dentin and pulpal tissue of the odontoma<sup>6</sup>. This enamel and dentin are usually laid down in an abnormal pattern because the organization of odontogenic cells fails to reach the normal state of morphodifferentiation<sup>5</sup>. So they are considered as developmental anomalies rather than true neoplasms. As this lesion is composed of more than one type of tissue, it is called as a composite odontoma. Odontomas are subdivided into compound and complex types.

A compound odontoma is composed of single or multiple small teeth-like structures. If the calcified dental tissues appear as an irregular mass bearing no morphologic similarity to even rudimentary teeth, they are called as complex composite odontomas<sup>7</sup>. Odontomas occur in the first and second decades of life<sup>8</sup>. 70% of odontomas are associated with pathologic changes such as impaction, malpositioning, aplasia, malformation and devitalization of adjacent teeth. Compound odontomas are twice as common when compared to complex odontomas. Nearly 60% of complex odontomas occur in women<sup>9</sup>.

Compound odontomas commonly occur in the incisor-canine region of the maxilla and complex odontomas are

frequently located in the premolar and molar regions of both jaws<sup>11</sup>. Radiographically, compound odontomas are characterized by multiple irregular radiopaque lesions that vary in size and shape and contains teeth-like structures called denticles, whereas a complex odontoma manifests as a radiopaque solid mass with occasional nodular elements and is surrounded by a fine radio-transparent zone. The lesions are unilocular and are separated from the normal bone by a well-defined corticalization line<sup>12</sup>.

Osteomas are benign tumours composed of mature compact or cancellous bone. Osteomas primarily involve the craniofacial skeleton and are rarely diagnosed in other bones. Most of them are solitary and asymptomatic, with very slow growth. Pain, tooth displacement and tooth impaction have been reported in a minority of cases. A complex odontoma may be confused with an osteoma; the low-attenuation halo that surrounds an odontoma in a radiograph, may help to differentiate these lesions.

Odontomas are treated by conservative surgical removal and prognosis is excellent. Timely detection and surgical enucleation of an odontoma followed by curettage, is recommended to prevent complications<sup>13</sup>.

## Case report

A 13 year old female patient was referred to us with the chief complaint of a swelling in the right lower jaw region since past one year. Mild tenderness of the region was present since then. The size of the swelling remained constant.



Figure 1



Figure 2

The patient had no history of any traumatic dental injuries. She had consulted a nearby private hospital and was referred to our Institute for definitive management. Extraoral palpation revealed a solitary swelling, measuring approximately 1×1 cm, present on the right lateral aspect of mandible, extending from midway of the body to the ramus; the swelling was tender, hard in consistency, non-compressible and non-reducible. Intraorally, there was tenderness on percussion of the right mandibular second premolar. On palpation, there was vestibular tenderness in relation to right mandibular first and second premolars. IOPA radiograph of right mandibular first and second premolar region, mandibular occlusal radiograph and an OPG were obtained.



Figure 3: IOPA radiograph of right mandibular first and second premolar region

OPG revealed a roughly oval shaped radiopaque area near the middle third of the roots of mandibular right first and second premolars, approximately 0.9cm×0.9cm in size

and surrounded by an area of radiolucency. Mandibular occlusal radiograph and IOPA radiograph of mandibular right first and second premolar region showed an oval shaped radiopacity, in the same region as seen in the OPG.



Figure 4 : OPG

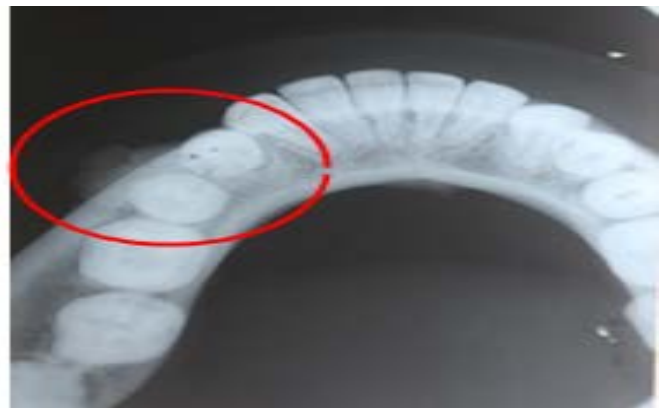


Figure 5 : Mandibular occlusal radiograph

A provisional diagnosis of a complex odontoma in relation to right mandibular first and second premolar region was made. Bony exostosis and Osteoma were also considered as differential diagnoses, and an excisional biopsy was planned.



Figure 6



Figure 7



Figure 8

Under local anesthesia, the lesion was approached intraorally and was completely excised (Figure 6). After thorough curettage of the area (Figure 7), the wound was closed using 4-0 silk (Figure 9). A composite and wire splint (Figure 10) was placed to stabilise the first molar and both the premolars of the region. The patient was advised to be on soft diet till splint removal. Oral hygiene instructions were given.



Figure 9



Figure 10

The excised lesion which was oval in shape and hard in consistency and of 1cm×1cm×1cm size was sent for histopathological examination. The histopathological report confirmed the lesion as a complex odontoma.



Figure 11



Figure 12

Sutures were removed on the seventh day (Figure 11). The composite and wire splint was removed after 4 weeks of surgery. The patient was under observation for a 6-month period. Intraoral healing was good, without any defects (Figure 12). Postoperative IOPA radiograph revealed good bony healing without any recurrence (Figure 13). There was no anaesthesia or paraesthesia of the areas or any other complications post operatively.



Figure

## Discussion

Odontomas are mixed tumours, consisting of both epithelial and mesenchymal cells that present a complete dental tissue differentiation<sup>14</sup>. Most of these lesions are invariably asymptomatic and are usually discovered on routine radiographical examinations during the second and third decades of life<sup>15</sup>. Studies have shown that most of the odontomas occur on the right side of the jaw<sup>5</sup>. The average age of occurrence was found to be 20.3 years<sup>16</sup> whereas our patient was only 13 years of age.

The origin of a complex odontoma is unknown; some suggest trauma or infection to be the cause<sup>17</sup>. Hitchin has said that odontomas are inherited or developed as a result of genetic mutation<sup>18</sup>. It has been related to various conditions like local trauma, inflammatory/ infectious processes, malformations of the mature ameloblasts, hyperactivity or overgrowth of cell rests of Serres, hereditary anomalies like Gardner's syndrome, Hermann's syndrome, odontoblastic hyperactivity, and alterations in the genetic components are responsible for controlling

dental development<sup>19</sup>. Infection from the deciduous predecessor may also be a factor, but a more generalized infection may be of some significance.

A study conducted by Bodin et al., found that children who had a history of prenatal rubella infection, acute pyogenic infection of the whole maxilla occurring shortly after birth, acute maxillitis of infancy, when examined at 6.5 years, had compound composite odontomas. This was due to pyogenic infection causing division of a tooth germ<sup>24</sup>. In a study conducted by Lopez-Areal et al., they found that a child developed multiple odontomas after experiencing traumatic intrusion of incisor teeth at the age of 10 months<sup>20</sup>.

Clinically, most odontomas are asymptomatic. Seldom have they caused swelling, pain, suppuration, bony expansion, and displacement of teeth<sup>21</sup>. The size of odontomas can vary from a few millimetres to many centimetres in their greatest dimension<sup>22</sup>. They may also be a reason for an unerupted / impacted teeth or retained deciduous teeth. Compound odontomas seldom cause bony expansion but complex odontomas often cause slight or even marked bony expansion<sup>23,24</sup>. The presence of odontomas may lead to aplasia, malformation, devitalization and malpositioning of adjacent teeth<sup>25</sup>.

## Classification

Odontomas are either complex or compound and are classified as intraosseous, which occur inside the bone or may erupt into the oral cavity, and extraosseous or peripheral, that occur in the soft tissue covering the tooth bearing portions of the jaws<sup>26</sup>.

One of the most common classifications is given by World Health Organization (WHO).

1. Ameloblastic fibro-odontoma: Consists of varying amounts of calcified dental tissue and dental papilla like tissue, the latter component resembling a fibroma. The

ameloblastic fibro-odontoma is considered as an immature precursor of a complex odontoma.

2. Odonto-ameloblastoma: It is a very rare neoplasm which resembles an ameloblastoma both structurally and clinically but contains enamel and dentin.

3. Complex odontoma

4. Compound odontoma

Radiographically, the first stage is characterized by radiolucency, due to the absence of dental tissue calcification. The second or intermediate stage shows partial calcification and the third or classically radiopaque stage exhibits predominant tissue calcification with the surrounding radiolucent halo<sup>27</sup>.

The lesion consists of normally appearing enamel or enamel matrix, dentin, pulp tissue and cementum, which do not exhibit a normal relation to each other. Histologically, the complex odontomas consist largely of mature tubular dentin. This dentin encloses clefts or hollow circular structures that contained the mature enamel that was removed during decalcification. The spaces may contain small amounts of enamel matrix or immature enamel. Small islands of eosinophilic-staining epithelial ghost cells are present in about 20% of complex odontomas. These may represent remnants of odontogenic epithelium that have undergone keratinization and cell death from the local anoxia. The connective tissue capsule around an odontoma is similar to the follicle surrounding the normal tooth.

Treatments of odontomas are surgical removal. The prognosis of these tumours is excellent, with a little tendency towards relapse. Early diagnosis of odontomas helps us to:

1. Adopt a less complex and less expensive treatment
2. Ensure better prognosis
3. Avoid relapse of the lesion
4. Avoid displacement or devitalization of adjacent teeth.

### Differential diagnosis

The differential diagnosis of a complex odontoma includes; cementoblastoma, osteoma, and fibro-osseous lesions such as cemento-ossifying fibroma. All these conditions can be differentiated due to their distinct radiographic appearance.

The case reported here, was sharing the clinical features of an osteoma. Radiographic and histopathological features are helpful to differentiate an odontoma from an osteoma. The radiographic images of odontomas and osteomas are characterized by an oval or round, heterogeneous radiopaque mass, with the distinct demarcation from the surrounding bone tissue of normal structure and mineralization. There is a translucent rim around the odontoma, corresponding to a thin fibrous capsule of the tumour, which is not observed in the case of osteomas.

Histopathological features also differentiate an odontoma from an osteoma. Compact osteomas are composed of normal appearing dense bone with minimal marrow, and cancellous osteomas are composed of bony trabeculae and fibro-fatty marrow. The osseous surfaces show minimal osteoblastic or osteoclastic activity. These features are entirely different from an odontoma, which is composed of dentin, cementum, pulpal tissue and enamel.

An odontoma has a limited growth potential, but it should be removed because it contains various tooth formulations that can predispose a cystic change, interfere with eruption of permanent teeth and cause considerable destruction of bone<sup>28</sup>. Because of the very low recurrence, the treatment of choice is surgical removal of the lesion. As it is a capsulated tumour, its removal is a simple surgical procedure but special care should be taken to remove it totally, in order to avoid a relapse which is especially critical in immature complex odontomas. Sometimes due to extension of the odontomas, the adjacent teeth may be disturbed while removing the odontomas<sup>29</sup>. A thorough

visual, manual as well as radiographic examination should be performed for all the pediatric patients who present with clinical evidence of delayed eruption, missing tooth or temporary tooth displacement, with or without a history of trauma.

### Conclusion

Odontomas are common, but complex odontomas are rare when compared to other odontomas. Most of the time, the lesions are asymptomatic and seen incidentally from dental radiographs. Odontomas should ideally be surgically excised and especially the complex odontoma if left untreated, may undergo pathological changes or may cause fracture of the bone due to expansion of the cortical plates. Since clinical or radiographical appearance of odontomas mimic other lesions, for a definitive diagnosis, both compound and complex odontomas need to be examined histopathologically.

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