

## CASE REPORT

# Compound Composite Odontoma diagnosed using Various Radiographic Examinations

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## ABSTRACT

Odontomas are benign lesions that take origin from dental tissues. They are generally classified into complex and composite type. Odontomas are usually asymptomatic but may present with signs and symptoms relating to their presence. The present case report is based on incidental finding of odontoma detected on routine radiographic examination of a 16-year-old female patient, who complained of over-retained deciduous tooth and missing of permanent tooth in maxillary anterior region of jaw. Various radiographic examinations using cone beam computed tomography (CBCT) were performed, which exhibited compound odontoma. The lesion was surgically operated and given for histopathological examination. Final diagnosis was given based on biopsy report obtained after surgical removal of the lesion.

**Keywords:** Compound odontoma, Cone beam computed tomography, Hamartomas, Odontoma, Retained deciduous tooth.

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## INTRODUCTION

Odontoma was initially referred as overgrowth of complete dental tissue. Later odontoma was referred as tumor or tumor-like lesion of odontogenic origin. It accounts for 22% of odontogenic tumor of jaw.<sup>1</sup> Recently, it is said that they represent hamartomatous malformation than neoplasm in which epithelial and mesenchymal cells show complete differentiation into ameloblast and odontoblast to form denticles composed of enamel, dentin, cementum, and pulp.

Odontoma is composed of enamel, dentin, pulp tissue, or cementum. Odontomas are usually asymptomatic but

may present with signs and symptoms related to delayed tooth eruption.

According to the World Health Organization, odontomas are classified as compound and complex odontomas. Compound odontomas are arranged in more orderly pattern unlike complex odontomas. Majority of odontomas are found before the second decade of life and on routine radiographic examination.

Odontomas are usually found in anterior esthetic region. It is beneficial for the clinician to diagnose odontoma at an early stage as patients usually come with the complaint of missing teeth at an early age. This helps to reduce the complex treatment planning, loss of esthetics, risk of malocclusion, and gives better prognosis of permanent tooth.

Conventional radiographs cannot give complete detail of any lesion and their exact position. Therefore, for proper understanding, a new imaging modality was used. Here, we present a case report of a young female where compound odontoma caused delayed eruption of permanent tooth in anterior maxillary esthetic region using CBCT.

## CASE REPORT

A young female patient 16 years of age came to the Department of Oral Medicine and Radiology, MA Rangoonwala Dental College with the chief complaint of retained deciduous tooth and unerupted permanent tooth in upper front region of jaw (Fig. 1).

Physical examination revealed patient was well built and nourished, medically fit with no relevant history. Extraoral examination showed no signs of swelling or relevant history.



**Fig. 1:** Intraoral photograph showing missing permanent teeth

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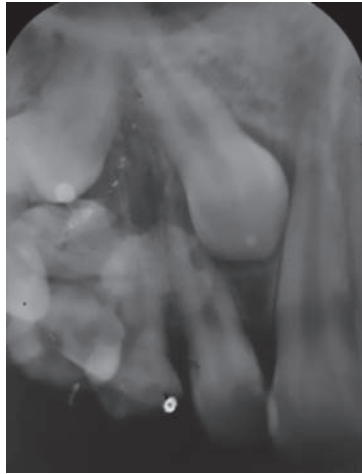


Fig. 2: Intraoral periapical radiograph

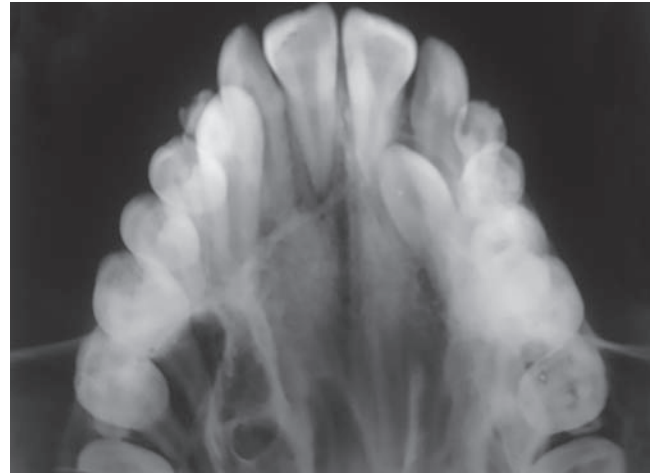


Fig. 3: Maxillary occlusal radiograph

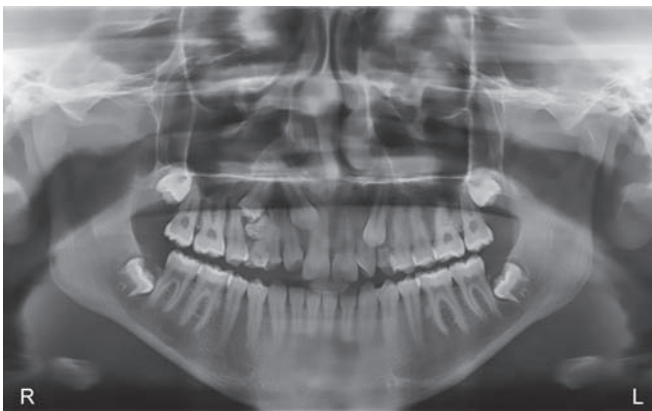


Fig. 4: Orthopantomogram radiograph

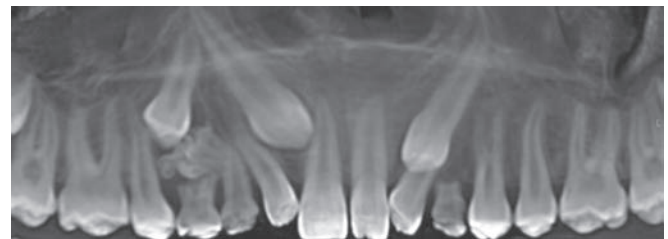


Fig. 5: Reconstructed panoramic view of CBCT scan

Intraoral examination revealed retained 53 and 54. Tooth 13 and 14 had not erupted in oral cavity. There was no sign of pain, infection, inflammation, and swelling. The surrounding overlying mucosa was normal.

Radiographic investigations were done.

- Intraoral periapical radiograph revealed radiopaque solid tissue, impacted 13 and 14 into the depth of maxillary alveolus and retained deciduous teeth 54 and 55 (Fig. 2).
- Maxillary occlusal radiograph (Fig. 3) showed superimposition of odontoma over deciduous and permanent teeth; therefore, three-dimensional CBCT was done.
- Orthopantomogram (Fig. 4) view was taken to rule out any other radiopaque mass in the oral cavity as patient had few deciduous teeth present and the orientation and depth of lesion could not be assessed properly on conventional radiograph.
- For proper understanding of the odontoma, CBCT scan (Figs 5 and 6) was taken with the help of CS 9300 Carestream with field of view 8 × 8 cm.

Scan showed cluster of small radiopaque mass of different density present below occlusal level mesial to unerupted or impacted crown of 14 located obliquely

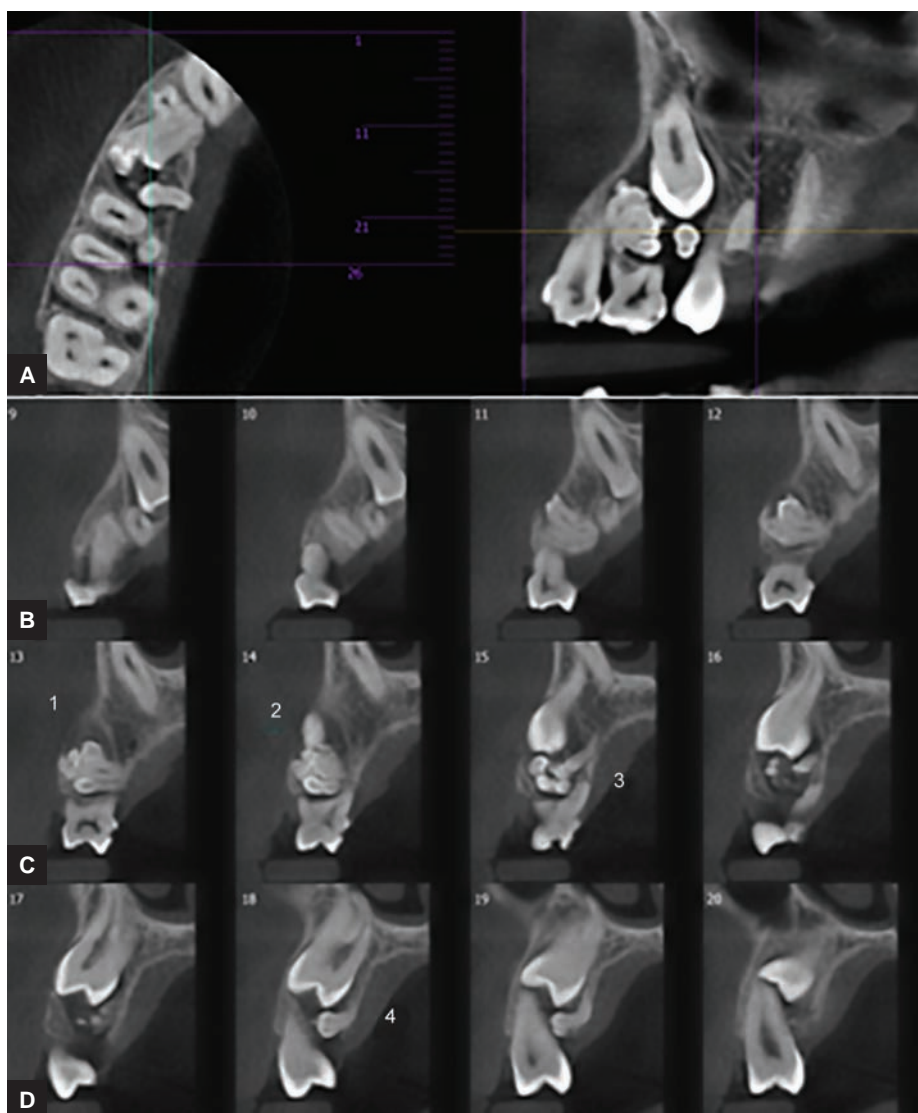
from periapical region of 54 to periapical region of 53 till mesial aspect of root 15.

More than two tooth-like masses having conical enamel-capped crowns and with fusion of radicular portion were seen along with denticles with respect to unerupted 14. Radiographic diagnosis was given as compound odontoma.

Surgical removal of entire lesion was done and three mineralized structures were obtained, which was sent for histopathological report (Figs 7 to 9). The decalcified section stained with hematoxylin and eosin showed presence of mineralized tissue in the form of dentin enclosing pulp-like tissue (Fig. 10) at various places and enamel-like tissue surrounding it (Fig. 10). Soft-tissue component seen in the form of epithelial strand and presence of ghost cells (Fig. 11) was appreciated. Report confirmed radiographic diagnosis.

## DISCUSSION

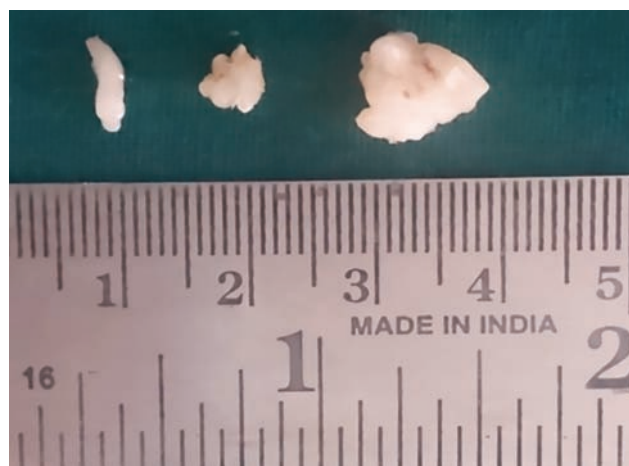
The term odontoma was first coined by Paul Broca in 1867 as tumor formed by the overgrowth of transitory or complete dental tissue.<sup>1</sup> It accounts for 22% of odontogenic tumor of jaw.<sup>1</sup> Recently, it is said that they represent hamartomatous malformation than neoplasm in which epithelial and mesenchymal cells show complete differentiation, which means that epithelial and mesenchymal cells get completely differentiated into functional ameloblast and odontoblast. These ameloblast and odontoblast further give rise to enamel, dentin, and at



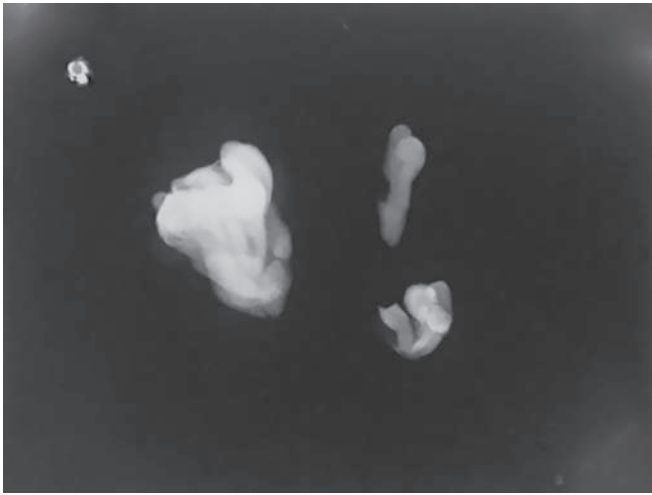
**Figs 6A to D:** Cross-section sagittal slices of CBCT showing radiopaque mass. (A) Cluster of radiopaque tooth-like structures/denticles seen, with different types of radiodensity present in the periapical region of 54. (B) Radiolucency seen around the lesion lined by well-defined radiopaque smooth corticated border surrounding the lesion suggestive of capsule. (C) Radiopaque structure resembling denticle seen near palatal cortical plate adjacent to dense radiopaque mass in the region of unerupted 14. (D) Radiopaque denticle crown with varied density present near middle third of root 15 and unerupted palatal cusp tip of tooth 14, with dilacerated root-like structure seen circumscribing crown of unerupted 14



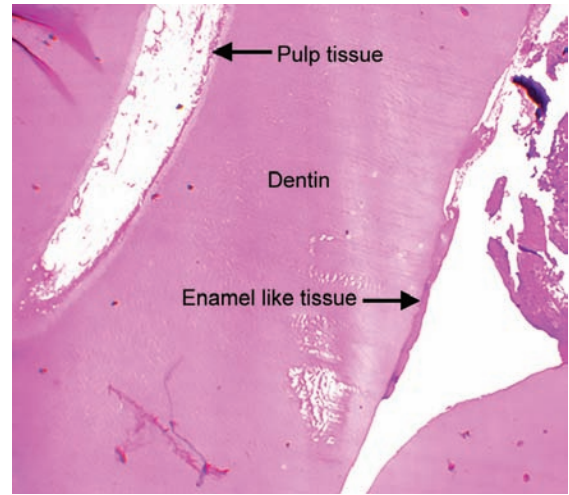
**Fig. 7:** Surgical treatment of mass



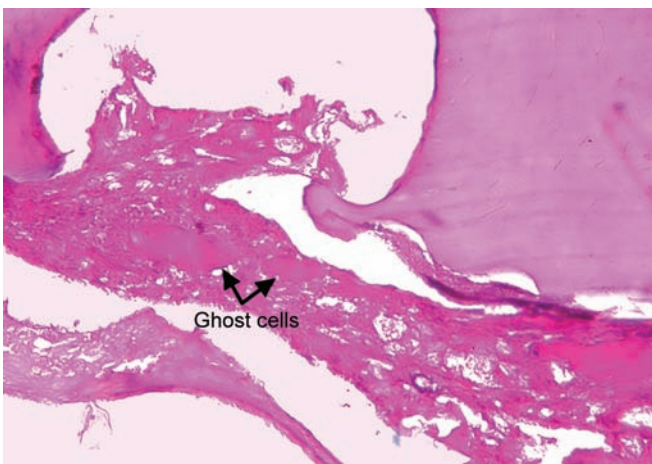
**Fig. 8:** Extracted mass obtained after extraction



**Fig. 9:** Intraoral periapical radiograph of mass removed



**Fig. 10:** Cross histopathology slide (4x) showing pulp tissue entrapped in dentin and surrounded by enamel-like tissue



**Fig. 11:** Histopathology slide (40x) showing ghost cells

times pulpal tissue of odontoma. This enamel and dentin which are formed are laid down into abnormal pattern because these odontogenic cells fail to reach normal state of morphodifferentiation.<sup>2</sup>

According to Worth<sup>4</sup> odontomas may be cystic, solid, made up of soft tissue, or solid and composed of dense and hard dental tissue. They may arise from any three solid dental tissues—enamel, dentin, and cementum. Most of the odontomas are made up of two or more solid dental tissue and are classified as:

- Ectodermal origin
  - Enameloma (enamel pearl, enamel nodule)
- Mesodermal origin
  - Dentinoma
  - Cementoma
- Mixed ectodermal and mesodermal origin, or mixed mesodermal origin
  - Complex composite odontoma
  - Compound composite odontoma
  - Germinated odontoma
  - Dilated odontoma, including dens in dente

Shafer et al<sup>3</sup> described odontoma to be any tumor of odontogenic origin but their current view supports and is accepted as hamartomas. They said that this lesion is composed of more than one type of tissue and for this reason they are called as composite odontoma. They classified it as

- Compound composite odontoma in which some composite odontomas, the enamel and dentin are laid down in such a way that structures show anatomic resemblance to normal teeth.
- Complex composite odontoma in which classified dental tissues are simply irregular mass bearing no morphologic similarity to rudimentary teeth.

Clinically, odontomas are classified according to their position as:<sup>2</sup>

- Intraosseous (erupted odontoma)—they occur inside the bone and may erupt into the oral cavity.
- Extraosseous—they occur in soft tissue covering the tooth-bearing portions of the jaw, having tendency to exfoliate.

Etiological factors like local trauma or infection, mature ameloblast, cell rests of Serres (dental lamina), odontoblastic hyperactivity, and hereditary anomalies (Gardner's syndrome, Hermann's syndrome) can lead to production of lesion. Depending on stage of odontogenesis, lesion may cause hypoplasia. Hitchin<sup>5-7</sup> suggested odontomas are either inherited or are formed due to mutant gene of interference with genetic control of tooth development postnatally.<sup>3</sup> Levy<sup>8</sup> reported production of this lesion by traumatic injury in rat.

Odontomas have slow growth and rarely exceed the size of tooth but can cause expansion of cortical plate with facial asymmetry when enlarged. They are usually asymptomatic but may present with signs and symptoms that consist of retained deciduous teeth, unerupted or impacted teeth, swelling, or evidence of infection. Budnick<sup>9</sup>

analysis stated that compound odontomas occur at very young to elderly age, with mean age of 14.8 years. Compound odontomas are found majority in maxillary region (67%) than mandibular region (33%); and 61% in anterior maxillary region of jaw.<sup>3</sup>

Differential diagnosis includes ameloblastic fibro-odontoma, ameloblastic fibroma, and odontoameloblastoma.

Worth<sup>4</sup> states that there are two distinct radiographic features of compound composite odontoma, which are:

- Cluster of small shapeless mass of solid tissue having no resemblance to tooth in shape but equal or greater in density depending on size of mass.
- Two or more tooth-like masses having conical enamel-capped crowns and with fusion of radicular portion.

The most important feature of all odontomas is presence of a fibrous capsule around the mass or lesion that appears in radiograph as thin dark radiolucent line surrounding the lesion.<sup>4</sup> They are frequently associated with unerupted teeth.

Histologic features of compound odontomas include normal-appearing enamel or enamel matrix, dentin, pulp tissue, and cementum, which may or may not exhibit a normal relation to one another. If the morphologic resemblance to teeth does exist, then the structures are usually single-rooted. The connective tissue capsule around the odontoma is similar to the follicle surrounding a normal tooth. Levy reported presence of "ghost" cells in odontomas to be present in nearly 20% odontomas, which he investigated.<sup>3</sup>

The treatment of odontoma is complete surgical removal, or surgical enucleation followed by curettage is recommended and there is no expectancy of recurrence. Budnick found male predilection for occurrence and most prevalent age for diagnosis and treatment being second decade of life.

## CONCLUSION

According to the reported case and reviewed literature, we concluded that the evaluated lesion, radiographically and histopathologically, was compound odontoma. It was present in association with retained teeth and an impacted tooth, which is very common. Esthetics was taken into consideration and the treatment of choice was complete

removal of the lesion. Early detection increases the possibility of retaining permanent tooth, with less damage, and ensures better prognosis.<sup>10</sup>

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