

# Orthodontic management of an impacted maxillary incisor due to odontoma

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## Abstract

Odontomas are a heterogeneous group of jaw bone lesions, classified as odontogenic tumors which usually include well-diversified dental tissues. Odontomas are the most common type of odontogenic tumors and generally they are asymptomatic. Two types of odontomas are described: compound and complex based on either the appearance of well-organized tooth-like structures (compound odontomas) or on a mass of disorganized odontogenic tissues (complex odontomas). Compound odontomas have a predilection for the anterior maxilla, whereas complex odontomas have a predilection for the posterior mandible. Odontomas frequently interfere with eruption of teeth leading to their impaction. This is a case report of a 14-year-old girl with an unerupted maxillary right central incisor due to a complex composite odontoma a rare occurrence in anterior maxilla. Surgical excision of the odontoma and orthodontic treatment to get the impacted maxillary right central incisor into alignment is discussed.

**Keywords:** Complex odontoma, impacted incisor, odontogenic tumour, odontoma, orthodontic treatment

## Introduction

Odontoma belongs to a group of dentigerous tumors developing in jaw bones in stages of odontogenesis. The term "odontoma," by definition alone, refers to any tumor of odontogenic origin. However, most authorities accept the view today that the odontoma represents a hamartomatous malformation rather than a neoplasm. According to definition of WHO, it is a congenital developmental defect, resulting from growth of completely differentiated epithelial and mesenchymal cells, in which all kinds of dental tissues occur. Similar to teeth, once fully calcified, they do not develop further.<sup>[1]</sup>

According to WHO classification (1992), two type of odontomas are acknowledged.

- Compound odontomas malformations with representation of all dental tissues and exhibiting an orderly distribution

in which numerous tooth-like structures known as denticles are found.

- Complex odontomas malformations in which all dental tissues are likewise represented, but showing a disorganized distribution.

The first is approximately twice as common as complex odontoma.

This lesion is composed of more than one type of tissue, and for this reason, has been called a composite odontoma.<sup>[2]</sup> Accordingly we have

- Complex composite odontoma
- Compound composite odontoma

Other types of odontomas are sometimes also seen, presenting combinations of the characteristics of compound and complex odontomas (i.e. mixed odontomas), while in other cases the lesions cannot be assigned to either of the two types (cystic adenomas).<sup>[3,4]</sup>

Although the etiology of this malformation is not yet known, there is some evidence to show that there is a genetic basis for both complex and compound composite odontomas. Heredity is a possible factor and persistent lamina could be the hidden inherited developmental anomaly. Other theories have been proposed, including local trauma, infection, family history, and genetic mutation.<sup>[5]</sup>

## Case Report

A 14-year-old, healthy female patient reported to the Department of Orthodontics, with the chief complaint of unerupted upper front tooth. Her medical history was not significant. Extraoral examination revealed no facial asymmetry [Figure 1]. Intraoral examination revealed unerupted maxillary right central incisor associated with a mild asymptomatic swelling which was slightly mobile on

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palpation, but with no inflammation of the overlying mucosa [Figure 2].

Intra-oral periapical, occlusal, and panoramic radiographs revealed the presence of the right central incisor with a radiopaque mass present incisally, thereby obstructing its eruption [Figure 3]. On the basis of clinical and radiographic findings, a provisional diagnosis of odontoma was established.

Complete excision of the odontoma under local anesthesia and orthodontic treatment for alignment of the impacted incisor was planned. Accordingly, an 0.018" MBT prescription preadjusted edgewise appliance was bonded on the upper arch. There was adequate space for the alignment of the impacted central incisor in the arch. After the initial leveling and aligning, surgical removal of the odontoma was done under local anesthesia.

A mucoperiosteal flap extending from the labial surface of right canine to the left canine was reflected and the calcified mass was exposed [Figure 4]. This was carefully excised without disturbing the unerupted tooth. The calcified structure measured 13 mm mesiodistally and 6 mm incisocervically [Figure 5]. The specimen was sent for histopathological examination which confirmed it as a complex composite odontoma with haphazardly arranged

hard tissues of tooth like dentin and globules of cementum-like material [Figure 6]. Curettage was done in the area and the area was debrided of any remnants. The layer of bone covering the labial surface of the impacted right central incisor was removed and the crown was exposed.

A Begg's bracket with a ligature wire extending was bonded onto the impacted incisor [Figure 7]. The area was irrigated and the mucoperiosteal flap was sutured back in position. The ligature wire extending from the bracket bonded on the impacted incisor was tied to the archwire thereby causing forced extrusion of the impacted incisor. The patient was recalled at 4-week intervals for tightening the ligature wire. After two visits, the right central incisor erupted into the oral cavity. 0.012" nickel titanium wire was engaged piggyback on the erupting incisor with a 0.016' x 0.022" stainless steel base archwire.

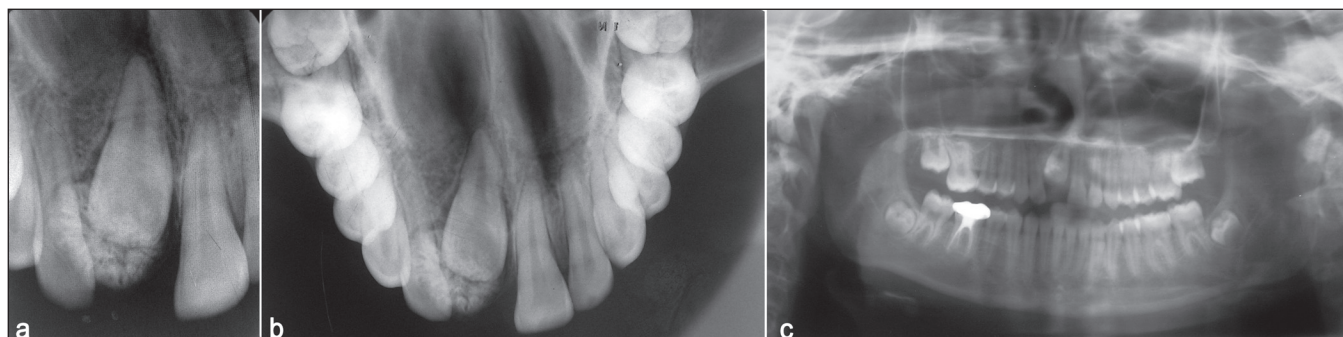
Six weeks later the impacted tooth was properly aligned in the arch. The Begg's bracket was replaced with a 0.018" MBT prescription bracket, and final finishing and detailing was achieved [Figure 8]. The total active treatment duration was 18 months. Retention was by means of upper Hawley's retainer. Figure 9 shows the extraoral photographs of the patient displaying a pleasing smile. Figure 10 shows the post-treatment radiographs of the patient.



**Figure 1:** (a and b) Pre-treatment extraoral photographs



**Figure 2:** Pre-treatment intraoral photographs

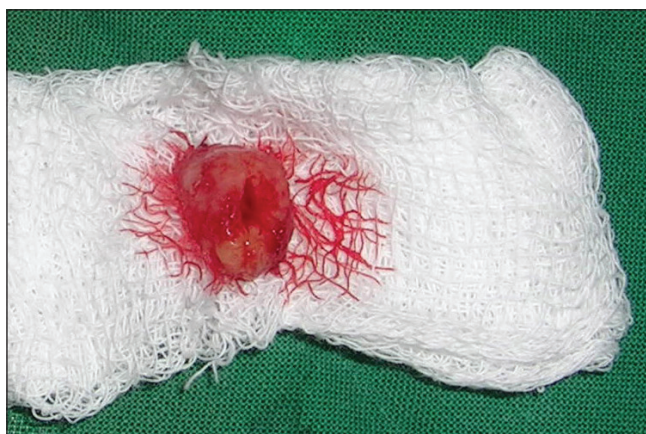


**Figure 3:** (a, b and c) Pre-treatment radiographs

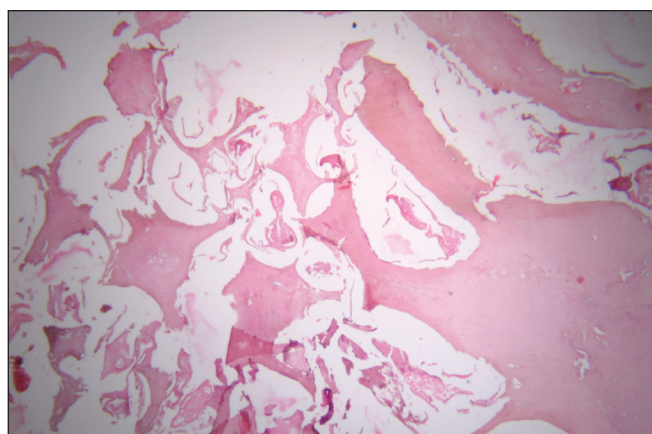




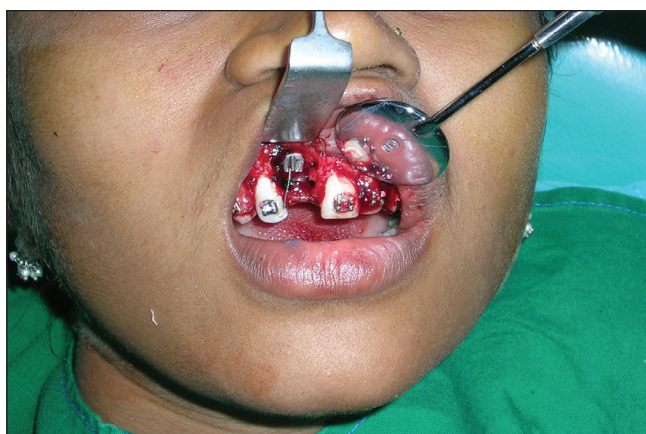
**Figure 4:** Surgical exposure of the odontoma



**Figure 5:** Excised specimen



**Figure 6:** Photomicrograph shows mixture of dental tissues arranged haphazardly [H and E stain, x16]



**Figure 7:** Begg's bracket with ligature wire extending bonded on the impacted incisor



**Figure 8:** Post-treatment intraoral photograph

## Discussion

The term "odontoma," by definition alone, refers to any tumor of odontogenic origin. Through usage, however, it has come to mean a growth in which both the epithelial and the mesenchymal cells exhibit complete differentiation, with

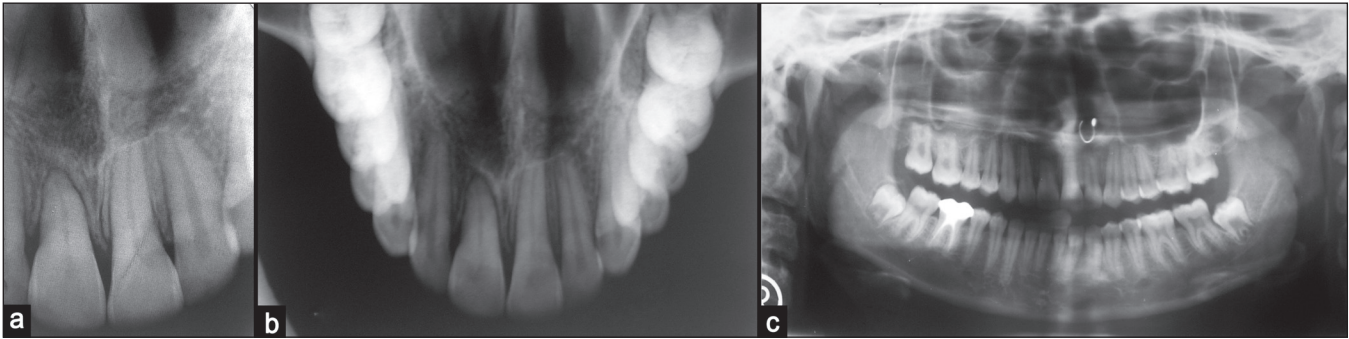


**Figure 9:** (a and b) Post-treatment extraoral photographs

the result that functional ameloblasts and odontoblasts form enamel and dentin.

Paul Broca was the first person to use the term "odontoma"





**Figure 10:** (a, b, and c) Post-treatment radiographs

in 1867. He defined the term odontoma as “tumors formed by the overgrowth of transitory or complete dental tissues.” Odontomas are hamartoma arising during normal tooth development, and they often reach a fixed size and are composed of mature enamel, dentin, cementum, and pulp tissues.<sup>[6]</sup>

Odontomas of all types comprise approximately 22% of odontogenic tumors of jaws.<sup>[7]</sup> There is no gender predilection and an odontoma can occur at any age but most commonly occurs in the second decade of life.<sup>[8]</sup>

Of all the odontomas combined, 67% occurred in the maxilla and 33% in the mandible. The compound odontoma has predilection toward the anterior maxilla (61%), whereas only 34% of complex odontomas occurred here. In general, complex odontoma had a predilection for the posterior jaws (59%) and lastly the premolar area (7%). Interestingly, both types of odontoma occurred more frequently on the right side of the jaw than on the left (compound 62%, complex 68%).<sup>[3,7,9]</sup>

The complex odontoma occurs predominantly in the second and third decades of life and the majority arises in the molar region of the mandible. They are often associated with the crowns of unerupted teeth and occasionally may take the place of a tooth. For these reasons they may be discovered, when small, as incidental findings when investigating a patient with a tooth missing from the dental arch. As the lesion enlarges it usually presents as a painless, slow-growing expansion of the jaw, but may become infected and present with pain, particularly if it communicates with the mouth. Multiple odontomas are rare.

Radiographically, a fully formed complex odontoma appears as a radiopaque lesion, sometimes with a radiating structure, but in the developing stages it shows as a well-defined radiolucent lesion in which there is progressive deposition of radiopaque material as calcification of the dental tissues proceeds. The mature lesion is surrounded by a narrow radiolucent zone analogous to the pericoronal space around unerupted teeth.

Histologically, the fully developed complex odontoma consists of a mass of disorderly arranged, but well-formed enamel,

dentine, and cementum. Dentine forms the bulk of the lesion and, on surfaces not covered by enamel or cementum, is in contact with tissue resembling the normal pulp. In decalcified sections, the areas occupied by enamel appear as empty spaces except where enamel maturation is incomplete when the spaces contain remnants of enamel matrix with a fibrillar appearance. The developing complex odontoma will contain varying amounts of soft tissue which include odontogenic epithelium and mesenchyme, and structures resembling enamel organs. Developing lesions show histological features of all stages in odontogenesis and may be difficult to differentiate from ameloblastic fibroma and ameloblastic fibro-odontoma.<sup>[10]</sup>

The treatment of choice is surgical excision. In general, the prognosis of these tumors is very favorable, with a scant tendency toward relapse.

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