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Management and Clinical Presentation of Compound Odontoma in a 14-Year-Old Patient

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Abstract

Compound odontoma is a benign odontogenic lesion commonly found in the anterior maxillary region and is composed of multiple small tooth-like structures formed by enamel, dentin, and pulp tissues. It is usually asymptomatic and often detected when there is delayed eruption of permanent teeth, particularly the maxillary central incisors. The lesion can act as a physical barrier in the eruption path, leading to impaction or displacement of the affected tooth. Early diagnosis through clinical and radiographic examination is essential for proper treatment planning. Conservative surgical removal is the treatment of choice, as the lesion is typically well-circumscribed and easily enucleated. Timely removal helps promote spontaneous eruption of the impacted tooth and prevents future esthetic, functional, and orthodontic complications, thereby supporting normal dental development in children.

Keywords: Compound odontoma, Delayed eruption, Follow-up, Maxillary central incisor, Surgical removal

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Background

Odontomas are the most prevalent type of odontogenic tumor, consisting of both mesenchymal and epithelial tissues. Odontomas, which are slow-growing and typically asymptomatic neoplasms, account for 22% of odontogenic tumors present in the jaws.[1] Odontomas can develop anywhere in the mandible or maxilla, showing no significant preference for age or sex, although they are often associated with primary teeth. They frequently impede the eruption of nearby teeth.[2]

According to the World Health Organization (2005), odontomas are classified into two categories: complex odontomas and compound odontomas, with the latter being somewhat more common.[3]

On roentgenographs, complex odontomas show up as irregular, calcified lumps that do not resemble teeth at all. The molar area is where they are more frequently observed.

Of all odontomas, 60% are compound odontomas. They can resemble teeth that have evolved regularly because of their highly distinct enamel and dentin, which are laid down in an organized manner. With a propensity to form more frequently in the maxilla, the majority occur in the incisor-cuspid region.[4]

After roentgenographic inspection, surgical excision, and histological analysis, the differential diagnosis of odontoma is established.

Some researchers consider odontoma, particularly compound odontoma, as supernumerary teeth,[5,6] which is against its classification as a neoplasm with odontogenic origin.

Surgical enucleation is the method used to treat odontomas. Since the tumor is often merely connected to the surrounding bone by connective tissue, this is easily achieved. Following excision, these lesions do not return.

This case study details the clinical procedure performed to treat a 14-year-old child who had an unusual odontoma that was fused to a maxillary right lateral incisor.

Case Presentation

A 14-year-old boy, accompanied by his parents, visited our department due to retained primary teeth in the upper front region, which had been present since he was 8 years old. His medical and dental histories were unremarkable.

The patient reported no past trauma and expressed feelings of consciousness while interacting with his peer group or when smiling in front of his peers.

Upon intraoral inspection, the patient's upper right deciduous central incisor was still present [Figure 1]. He had calculus and stains, and his dental hygiene was poor. There was a class I malocclusion with a normal overjet and overbite. It was suggested that cone-beam computed tomography (CBCT) and panoramic radiography be used for additional research. A panoramic radiograph showed a radiopaque mass of tiny, tooth-like calcified formations between the mesio-incisal surface of 21 and the root apex of 51 [Figure 2].

Axial sections of CBCT revealed a well-defined radio-opaque mass of calcified structure, surrounded by well-defined radiolucency, at the root apex of retained deciduous 51 and mesio-incisal cusp of impacted 11, along with thinning of buccal and lingual cortical plates, which were noted in the region of impacted 11 [Figure 3]. Sagittal section showed impacted 11 with follicular hyperplasia, which was approximately 2 mm from the apex of 51, with its root lying in the floor of the nasal cavity. The distance between the incisal edge of impacted 11 and the mesial aspect of the denticles was 2.3 mm [Figure 4].

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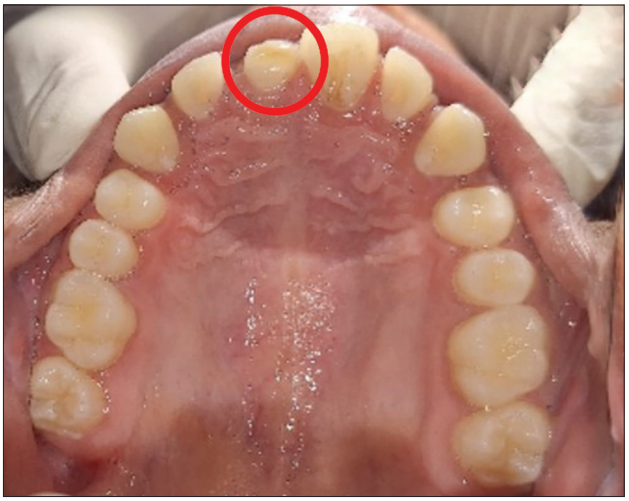

Figure 1: Retained upper right deciduous central incisor

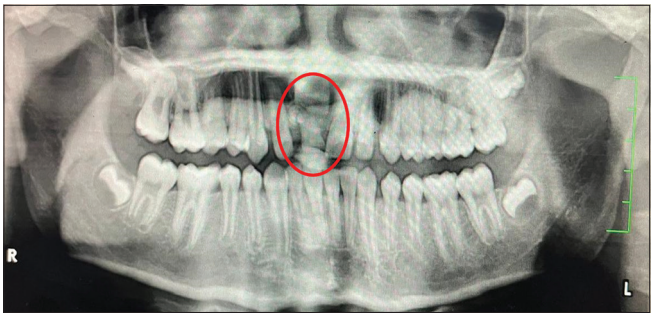

Figure 2: Panoramic radiograph with radiopaque mass of calcified structures

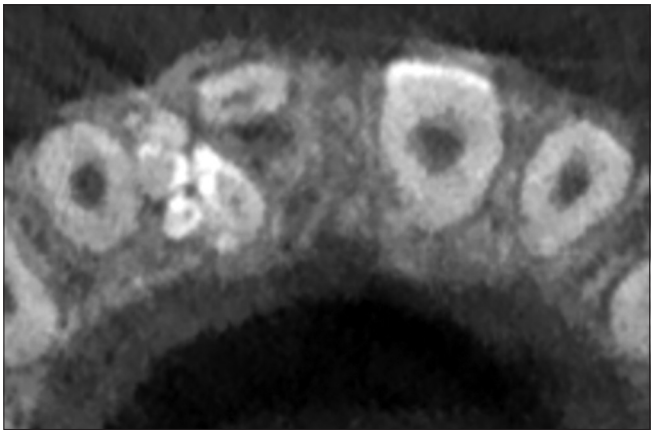

Figure 3: Axial section of cone-beam computed tomography

The proposed treatment was the extraction of the retained upper right primary central incisor, followed by a complete excision of the lesion.

Written informed consent in the patient's mother tongue was obtained from the parent before the procedure, as the patient was a minor. Assessment of blood investigations was also done before to ensure patient suitability for surgery.

Local anesthesia with adrenaline (1:100,000) was administered. Nasopalatine and infraorbital blocks, along with

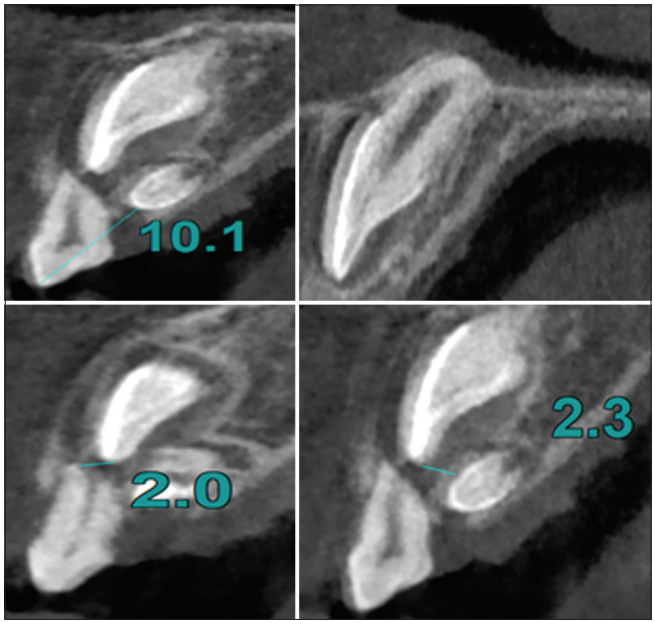

Figure 4: Sagittal section of cone-beam computed tomography

incisive infiltration, were used. Objective and subjective signs and symptoms of anesthesia were confirmed before proceeding. The retained primary tooth was extracted using maxillary incisor pediatric forceps [Figure 5]. A full-thickness mucoperiosteal flap was raised using Blade No. 15, by giving a crevicular incision [Figure 6]. Thorough curettage was performed, and eight additional pieces were removed. Continuous irrigation with betadine and saline solution was done to prevent debris collection [Figure 7].

Interrupted sutures were placed with Vicryl non-resorbable material to close the surgical site.

The patient was monitored for an hour post-surgery before discharge. Post-operative care instructions provided included: Pain management, oral hygiene instructions. The patient was discharged with detailed instructions to ensure a smooth recovery and prevent any post-operative complications.

After surgical excision, all fragments of the odontoma, along with the primary teeth, were preserved in 10% formalin and submitted for histopathological examination. This procedure aims to confirm the diagnosis, as well as to rule out any potential malignant transformation or associated pathology.

Histopathology report revealed decalcified H and E-stained sections with shrunken enamel organic matrix, dentin showing dentinal tubules and a zone of pulp confirming compound odontoma [Figure 8].

The patient was scheduled for a follow-up appointment 1 week later for the removal of sutures. The healing process occurred spontaneously and without any complications.

The patient was recalled after 1 month for follow-up. At the 1-month follow-up, healing had progressed appropriately. CBCT reports confirmed that the odontoma had been successfully removed [Figure 9].

Follow-up appointments were scheduled at 3-month intervals. At the 6-month review, approximately three-quarters of the maxillary right central incisor crown had erupted [Figure 10]. By 12 months, the tooth had fully erupted, and radiographic examination showed evidence of complete apex closure [Figure 11].

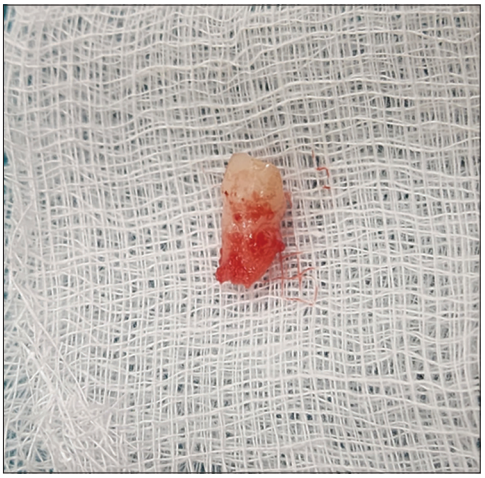

Figure 5: Retained #51

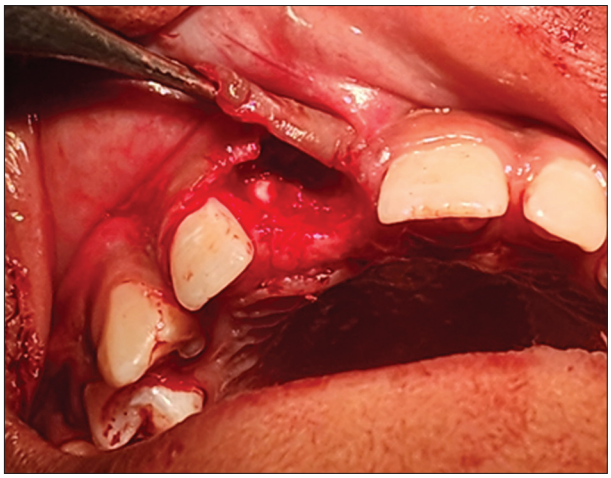

Figure 6: Full-thickness mucoperiosteal flap

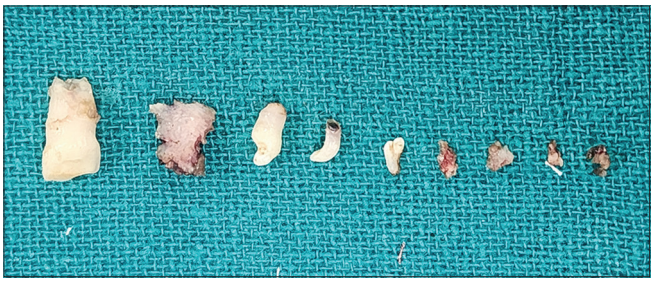

Figure 7: Picture depicting extracted tooth and odontomas

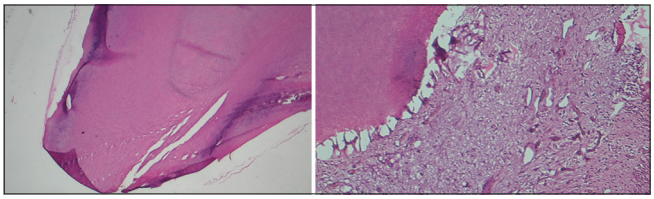

Figure 8: Histopathological report of the excised odontoma

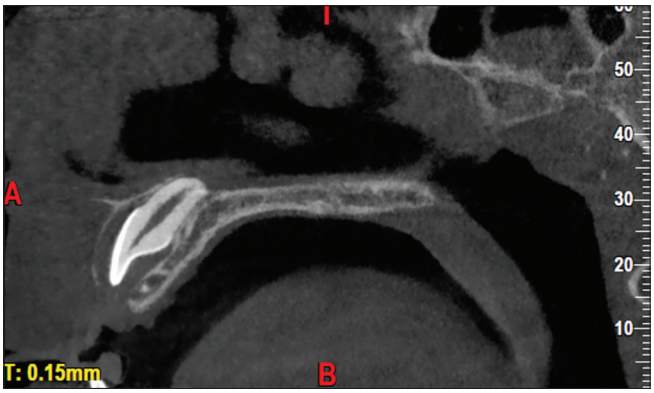

Figure 9: Cone-beam computed tomography revealed the absence of odontoma

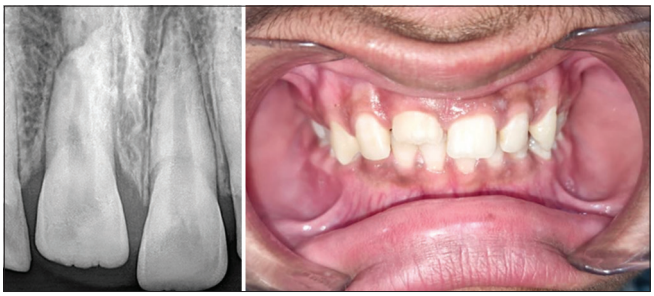

Figure 10: Follow-up at 6 months showing 3/4th eruption of #11

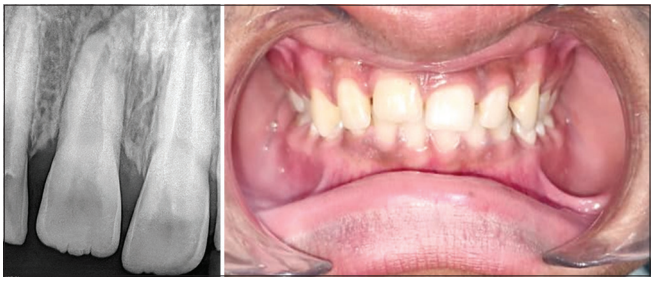

Figure 11: Follow-up at 12 months showing eruption of #11 with apex closure radiographically

Discussion

Odontoma is a type of dental malformation that arises from the proliferation of both epithelial and mesenchymal components derived from dental lamina remnants. These components undergo full differentiation, producing functional ameloblasts and odontoblasts, which form enamel and dentin.[7,8]

Odontomas are frequently detected on routine radiographs, most commonly in patients between 10 and 19 years of age. They have an incidence of 0.4%, with the complex type being the most common, accounting for 62% of cases.[9] Odontomas are generally asymptomatic but may be linked to clinical signs such as unerupted or impacted teeth, delayed shedding of primary teeth, tooth displacement, and/or malocclusion.[9-11]

A developing odontoma can be identified through routine radiography, although its detection may sometimes be challenging due to incomplete calcification.[10] In contrast, a mature compound odontoma presents as a cluster of tooth-like structures encased by a thin radiolucent zone.[7,12] The compound odontoma appears as a group of multiple radio-opaque, small

tooth-like structures called denticles.[13] In some cases, they may grow large enough to cause bone expansion, leading to facial asymmetry.[13] In most cases, pathological changes in adjacent teeth include devitalization, malformation, aplasia, malposition, or impaction. As the odontoma increases in size, it can lead to sequestration or resorption of the overlying bone, resulting in occlusal movement.[7,12] The extent of morpho-differentiation and histodifferentiation of dental hard tissues is crucial for the differential diagnosis of odontoma.[13,14] Although ameloblastic odontoma and ameloblastic fibro-odontoma share a closer radiographic resemblance to odontoma, histopathological examination is always recommended for a definitive diagnosis.[14,15]

Pippi also suggests using CBCT to diagnose the condition, as it helps clarify the boundaries of the lesion and detect any thinning or perforation of the cortical bone.[16-18] CBCT provides an accurate and detailed morphological characterization of the key structures (teeth) involved in the odontoma.[19,20] CBCT scanning provides volumetric images that help determine the position of the odontoma not only vertically but also in the vestibular-oral direction. This imaging technique allows for a detailed evaluation of the odontoma and impacted teeth, including their topography, the condition of adjacent cortical bone, and the potential for root resorption. CBCT also aids in planning orthodontic treatment and pinpointing the exact location for accurate surgical excision.

In the present case, the prolonged retention of the deciduous tooth and the impaction of the permanent successor were linked to the presence of an odontoma, as confirmed by the radiographs, which is common in most cases.

Surgical enucleation is typically the preferred treatment for most cases of compound odontoma. If odontomas are removed early without affecting the underlying tooth germ, the impacted teeth may erupt spontaneously or with the help of orthodontic traction. In this case, the odontomas, along with the retained deciduous teeth, were surgically removed.

Conclusion

Early diagnosis of odontoma results in less complicated treatment and a more favorable prognosis. Given that the most common location for compound odontomas is the incisor-canine region and canines are the teeth most often impacted, it is important to consider the possibility of an odontoma in the vicinity when diagnosing canine retention. Correctly identifying the condition allows clinicians to choose a simpler, less complex treatment approach, leading to a better prognosis.

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Consent

Written informed consent was obtained from the patient before preparation of the case report.

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