

Surgical management of multiple compound odontome associated with impacted maxillary central incisors: A pediatric case series

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Abstract

Background: Compound odontomas are benign odontogenic hamartomas that frequently interfere with the eruption of permanent teeth. Multiple compound odontomas associated with impacted maxillary central incisors are uncommon in children and may result in delayed eruption, retained primary teeth, and esthetic concerns. Early diagnosis and timely intervention are essential to preserve the developing dentition and facilitate normal eruption.

Case Presentation: This case series describes two pediatric patients presenting with delayed eruption of maxillary permanent central incisors secondary to multiple compound odontomas. An 11-year-old female presented with an impacted maxillary left central incisor, while an 8½-year-old male presented with prolonged retention of the primary right central incisor and impaction of the permanent successor. Both patients underwent conservative surgical removal of the odontomas under local anesthesia while preserving the impacted permanent incisors. Surgical management successfully eliminated the mechanical obstruction to eruption without intraoperative or postoperative complications. Healing was uneventful in both patients, and no recurrence was observed during follow-up. Preservation of the impacted incisors maintained the potential for spontaneous eruption, minimizing the need for immediate orthodontic intervention.

Conclusion: Early conservative surgical removal of the odontoma, combined with periodic follow-up, promotes favorable eruption potential and contributes to improved functional and esthetic outcomes while reducing the likelihood of complex orthodontic treatment.

Keywords: Odontoma; Multiple compound odontome; Impacted maxillary central incisor; Delayed eruption

1. Introduction

Odontoma is the most common benign odontogenic tumour of the jaws and is generally considered a developmental hamartomatous malformation rather than a true neoplasm.¹ It originates from fully differentiated epithelial and mesenchymal cells responsible for the formation of enamel, dentin, cementum, and pulp tissue. Odontomas are broadly classified into compound and complex types based on their histomorphological organization. Compound odontomas exhibit an orderly arrangement resembling miniature tooth-like structures and complex odontomas present as an irregular conglomerate mass of calcified dental tissues.²⁻⁴

Multiple odontomas are relatively uncommon findings in pediatric patients and are frequently associated with disturbances in eruption, impaction, delayed exfoliation of primary teeth, malocclusion, displacement of adjacent teeth, and esthetic concerns. In the mixed dentition period, early diagnosis and timely intervention are of paramount importance to prevent long-term functional complications. These lesions are often asymptomatic and are usually

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detected incidentally during routine radiographic investigations performed for delayed tooth eruption or retained deciduous dentition.

The etiology of odontoma formation remains unclear; however, trauma, local infection, hereditary influences, genetic mutations, and disturbances during odontogenesis have been implicated as possible contributing factors.⁵⁻⁶ Radiographic examination plays a pivotal role in diagnosis and treatment planning. Surgical removal remains the treatment of choice and is often followed by spontaneous eruption or orthodontic traction of impacted permanent teeth, depending on the age of the child and developmental stage of the involved dentition.

Given the rarity of multiple odontomas in children and their significant impact on developing occlusion, reporting such cases contributes to the existing literature and enhances clinical understanding of diagnostic and therapeutic considerations. This case series presents two pediatric cases of multiple odontomas managed surgically at the Department of Pediatric and Preventive Dentistry, Government Dental College, Kozhikode.

2. Case 1

An 11-year-old female patient reported to the Department of Pediatric and Preventive Dentistry, Government Dental College, Kozhikode with the chief complaint of a missing upper left front tooth. The patient and parent expressed concern regarding aesthetics and speech. Medical, family, and dental histories were non-contributory, with no history of trauma to the anterior maxillary region.

- **Extraoral examination** revealed a symmetrical facial profile with no evidence of facial swelling or tenderness. Lip competence was adequate and not associated with pain and discomfort.
- **Intraoral examination** demonstrated unerupted maxillary left permanent central incisor (tooth 21). Intra-oral examination revealed the presence of a smooth surfaced, dome shaped swelling of size approx. 2x2 cm in relation to unerupted 21 region. (Figure 1). Non-tender, No local rise in temperature. Hard in consistency.

2.1. Radiographic Evaluation

An intraoral periapical radiograph and orthopantomogram (OPG) were obtained for preliminary assessment. The radiographs demonstrated multiple small radiopaque structures resembling tooth-like entities in the anterior maxillary region in relation to the unerupted maxillary left central incisor, suggestive of multiple compound odontome. The impacted maxillary left central with complete root formation and an unfavorable eruptive path.

For detailed three-dimensional evaluation, Cone Beam Computed Tomography (CBCT) was advised. CBCT imaging revealed obliquely impacted 21 noted with crown directed labially and inferiorly and root directed palatally and superiorly. Multiple tooth like structures varying size and density noted mesio labial and palatal to crown of impacted 21 within a single capsule. Left lateral wall of nasopalatine canal involved by the structures and thinning of palatal cortical plate noted at this region. (Figure 2)

2.2. Procedure

A conservative surgical approach involving removal of the odontome was planned

Following informed parental consent, the procedure was performed under local anesthesia using 2% lignocaine with 1:80,000 adrenaline. A full-thickness mucoperiosteal flap was reflected in the anterior maxillary region from distal of 11 to distal of 23. Conservative bone guttering was performed to expose the calcified structures. Multiple tooth-like denticles were carefully removed, and the surgical site was thoroughly curetted and irrigated with sterile saline. The flap was repositioned and sutured using 3-0 silk sutures and the patient was recalled after one week for suture removal. (Figure 3,4)

2.3. Histopathological Examination

The excised specimen was submitted for histopathological analysis. Gross examination revealed multiple calcified tooth-like structures of varying sizes. Microscopic examination showed the presence of organized enamel matrix, dentin, pulp tissue, and cementum arranged in a tooth-like pattern, confirming the diagnosis of a **compound odontome**.

The patient remained asymptomatic, with satisfactory healing of the surgical site and no evidence of recurrence. (Figure 5)



Figure 1 Preoperative image showing missing permanent left central incisor

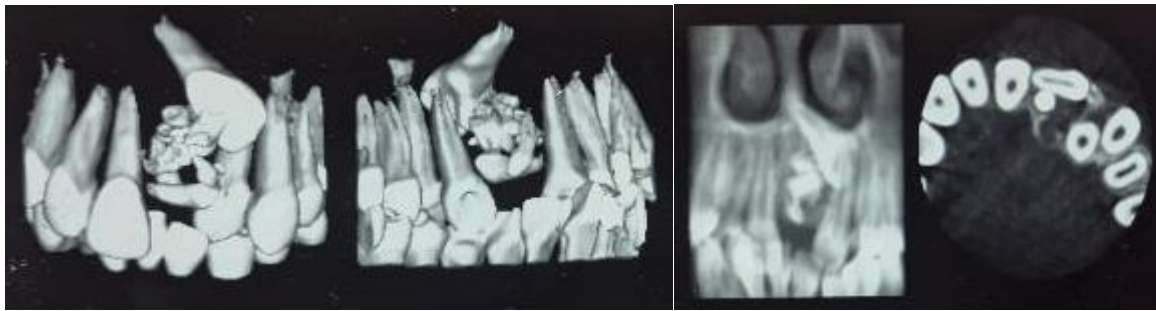


Figure 2 CBCT sections showing compound odontoma in relation to impacted 21

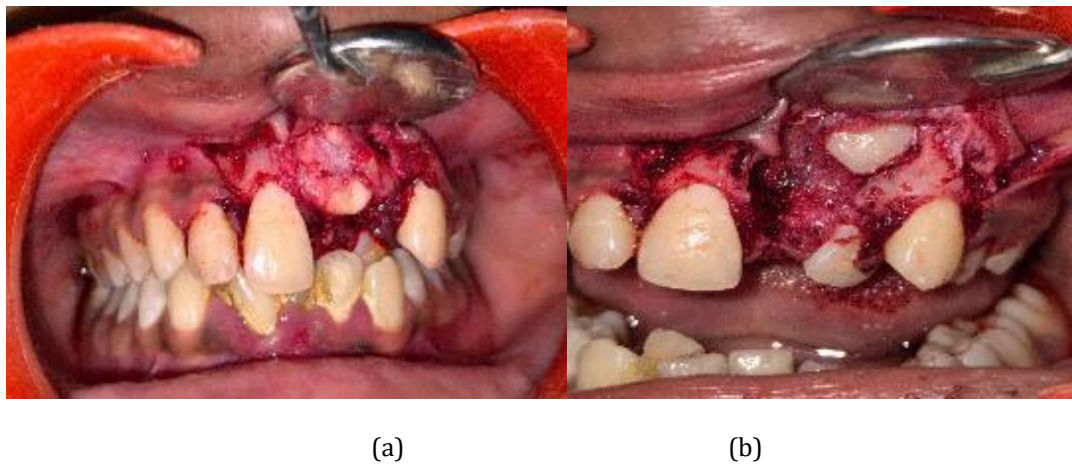


Figure 3 Intra operative images showing (a) compound odontoma (b) Impacted permanent left central incisor



Figure 4 Multiple teeth-like structures and the cystic lining that was removed



Figure 5 Post operative image after removal of multiple compound odontome

3. Case 2

An 8 and half year-old male patient reported to the Department of Pediatric and Preventive Dentistry, Government Dental College, Kozhikode with the chief complaint of persistence of the upper right front milk tooth and delayed eruption of the corresponding permanent tooth. The parent expressed concern regarding the unaesthetic appearance and delayed exfoliation of the deciduous tooth. The patient's medical and family histories were non-contributory, and no previous history of trauma to the maxillary anterior region was reported.

- **Extraoral Examination** revealed a symmetrical facial profile with no signs of swelling, or tenderness in the anterior maxillary region. Regional lymph nodes were non-palpable and non-tender.
- **Intraoral Examination** showed the retained maxillary right primary central incisor (51) was present beyond its expected exfoliation period, whereas the permanent maxillary right central incisor (11) was clinically absent. The overlying mucosa in the region of tooth 11 appeared normal, without any signs of inflammation or swelling. Palpation of the anterior maxillary region revealed no tenderness or obvious bulging suggestive of the unerupted permanent tooth.(Figure 6). Space analysis demonstrated adequate mesiodistal space for eruption of tooth 11 within the dental arch. Adjacent teeth appeared clinically normal, with no evidence of mobility or pathology.

3.1. Radiographic Evaluation

An intraoral periapical radiograph (IOPA) of the anterior maxillary demonstrated multiple radiopaque tooth-like structures in relation to the unerupted permanent maxillary right central incisor, suggestive of a compound odontome. The developing permanent maxillary right central incisor (11) was observed in an impacted position superior to the retained primary tooth.

To further assess the exact location, orientation, and relationship of the lesion with adjacent anatomical structures a Cone Beam Computed Tomography (CBCT) was performed. CBCT examination revealed an impacted right maxillary central incisor at the root apex of the retained 51 with the crown placed labially and slightly tilted distally and the root is directed superiorly in such a way that it lies just below the floor of right nasal fossa. A group of small tooth like structures suggestive of compound odontoma are seen below the crown of impacted tooth. No associated cystic changes, cortical bone perforation, or root resorption of adjacent teeth were identified. Adequate eruptive potential of the permanent incisor was observed owing to favorable angulation and sufficient arch space. (Figure 7)

Considering the patient's age, favorable position of the impacted incisor, and sufficient space availability within the arch, a conservative surgical approach involving extraction of retained tooth 51 and surgical removal of the odontome was planned to eliminate the mechanical obstruction and promote spontaneous eruption of tooth 11.

3.1.1. Procedure

After obtaining informed consent from the patient's parent, the procedure was performed under local anesthesia using 2% lignocaine hydrochloride with 1:80,000 adrenaline. Aseptic protocol was maintained throughout the procedure. The retained primary incisor (51) was atraumatically extracted. Subsequently, a full-thickness mucoperiosteal flap was reflected in the anterior maxillary region to gain adequate surgical access. Conservative bone guttering was carried out to expose the calcified lesion. Multiple tooth-like calcified structures resembling denticles were identified and carefully removed without disturbing the impacted permanent central incisor. (Figure 8,9)

The surgical site was thoroughly curetted and irrigated with sterile saline to remove debris and ensure complete elimination of the obstructing lesion. The impacted permanent tooth was preserved and left untouched to allow for physiological eruption. The flap was repositioned and secured using interrupted 3-0 silk sutures (Figure 10)

3.2. Histopathological Examination

The excised specimen was submitted for histopathological analysis. Gross examination revealed multiple calcified tooth-like structures of varying morphology and size. Microscopic examination demonstrated enamel matrix, dentin, cementum, and pulp tissue arranged in an orderly tooth-like configuration, confirming the diagnosis of a **compound odontome**.

Healing of the surgical site was uneventful. No postoperative complications or recurrence were observed during the follow-up period.



Figure 6 Preoperative image showing retained primary right central incisor





Figure 7 CBCT sections showing multiple compound odontoma in relation to impacted 11



Figure 8 Intra operative images



Figure 9 Multiple teeth-like structures and the cystic lining that was removed



Figure 10 Post operative image

4. Discussion

Odontomas are frequently associated with disturbances in tooth eruption, including prolonged retention or premature loss of deciduous teeth and delayed eruption of permanent successors.⁷ They are predominantly diagnosed during the first and second decades of life. Although no definitive sex predilection has been established, Budnick reported a slightly higher prevalence among males (59%) compared to females (41%). Furthermore, odontomas have been reported to occur more commonly in the maxilla (67%) than in the mandible (33%).⁸ Compound odontomas are generally observed in the anterior region of the jaws, whereas complex odontomas are more frequently encountered in the posterior segments. Additionally, both variants tend to exhibit a greater occurrence on the right side compared to the left.⁷

The World Health Organization (WHO) in 2017 classified odontoma as a group of benign mixed epithelial and mesenchymal odontogenic tumors⁹. In the present case series the first case involved an 11-year-old girl with an impacted maxillary left central incisor (21), while the second case involved an 8-year-old boy with retained tooth 51 and an impacted permanent maxillary right central incisor (11). Although both patients presented with delayed eruption secondary to odontomas, differences in age and clinical presentation were observed. The younger patient exhibited retention of the primary incisor, which served as an important clinical indicator of an underlying eruptive obstruction. Conversely, in the older child, delayed eruption of the permanent incisor without primary tooth retention was the predominant finding.

Radiographic assessment played a critical role in both cases. CBCT was particularly valuable in treatment planning by evaluating the orientation of the impacted tooth, proximity to adjacent roots, and extent of calcified obstruction. This observation aligns with current evidence supporting the role of CBCT in improving diagnostic accuracy in cases of impacted anterior teeth. The rationale for conservative management in these patients was based on the concept that elimination of the eruptive barrier at an early age may restore the natural eruptive pathway of the impacted tooth.

Sharma and colleagues¹⁰ reported a case in 2010 involving the surgical removal of 37 odontomas in a 17-year-old patient. Likewise, a case published in 2024 described the excision of 15 odontomas in a 9-year-old child. In the present case, approximately 50 denticles were removed from a 9-year-old pediatric patient, representing a notably high number of odontomas. The patient remains under periodic follow-up to assess the spontaneous eruption of the impacted maxillary right central incisor. In the absence of eruption within 9–12 months, surgical exposure combined with orthodontic intervention may be considered.

According to Mason et al¹¹, immature permanent incisors demonstrate a favorable tendency for spontaneous eruption following the removal of associated obstructive supernumerary structures.

5. Conclusion

Management of impacted maxillary central incisors associated with odontomes remains a clinical challenge in pediatric dentistry, requiring timely diagnosis and careful treatment planning. Early radiographic evaluation, including advanced imaging when indicated, plays a crucial role in identifying the location and extent of the odontoma. The present two-case series highlights that conservative surgical removal of the odontome can successfully eliminate the mechanical obstruction to eruption and facilitate the spontaneous eruption of impacted maxillary central incisors in children. Early intervention and regular postoperative follow-up are essential to achieve favorable functional and esthetic outcomes while minimizing the need for complex orthodontic treatment.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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