



Research Paper

Conservative Surgical Management of Compound Odontome in the Anterior Maxillary Region of a Pediatric Patient Followed by Orthodontic Extrusion of an Impacted Central Incisor: A Case Report

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ABSTRACT

Background: Compound odontomas are benign odontogenic hamartomas that commonly occur in the anterior maxilla and may prevent the eruption of permanent teeth. When associated with an impacted maxillary central incisor, early and carefully planned treatment is important to restore both aesthetics and function.

Case Presentation: A 10½-year-old child presented with delayed eruption of the maxillary right central incisor. Clinical and radiographic examination revealed an impacted central incisor associated with a compound odontoma in the anterior maxillary region. A conservative surgical approach was adopted to remove the odontoma while preserving the impacted tooth and surrounding tissues. Following adequate healing, orthodontic traction was initiated to guide the impacted incisor into the dental arch.

Results: Removal of the odontoma and gradual orthodontic extrusion resulted in satisfactory positioning of the tooth within the arch.

Conclusion: Early diagnosis, minimally invasive surgery, appropriate timing of orthodontic extrusion, and multidisciplinary management are key to achieving successful aesthetic, functional, and periodontal outcomes.

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I. INTRODUCTION

Odontomes are benign hamartomatous lesions of odontogenic origin and are the most common odontogenic tumours in dental practice. The 2022 World Health Organization (WHO) classification categorises them as compound or complex based on their structural organisation [1]. Compound odontomes consist of multiple tooth-like structures (denticles), whereas complex odontomes comprise a disorganised mass of enamel, dentine, cementum, and pulpal tissue without resembling a tooth [2].

Compound odontomes most commonly occur in the anterior maxilla, where they frequently obstruct eruption of permanent teeth, particularly during mixed dentition [3]. Impaction of the maxillary central incisor is of particular concern because of its essential role in aesthetics and function, making early multidisciplinary management crucial [4].

This case report describes the surgical and orthodontic management of a compound odontome causing impaction of the maxillary right central incisor in a 10½-year-old child, highlighting the clinical decision-making process and the evidence supporting each stage of treatment.

II. CASE REPORT

Patient History and Chief Complaint

A ten and half-year-old female patient presented to the Department of Paediatric Dentistry with a complaint of non-eruption of the upper right front tooth. Her parents reported that the contralateral central incisor (# 21) had erupted normally at approximately seven years of age, whereas upper right front tooth (#11) had not emerged. There was no relevant medical history, no history of trauma to the primary dentition, and no familial predisposition to dental anomalies. The primary maxillary right central incisor (# 51) was absent.

Clinical Examination

General examination revealed a well-nourished child with normal facial symmetry and no lymphadenopathy. Intraoral examination demonstrated a mixed dentition and mild buccal mucosal fullness were noted in the region of tooth 11. No evidence of sinus tracts, soft tissue swelling, or intraoral sinus formation was apparent. The upper left permanent central incisor shows slightly mesially angulated.

Occlusal assessment demonstrated an Angle's Class I molar relationship bilaterally. The available space in the arch for tooth 11 was measured at 8.4 mm, compared with 8.7 mm for tooth 21, indicating adequate space for eventual alignment.

Radiographic Assessment

The IOPA radiograph revealed a well-circumscribed, irregular, radiopaque mass measuring approximately 12 × 9 mm superimposed on the crown of the unerupted tooth 11. The mass demonstrates small, well-defined, radiopaque, tooth-like structures (denticles) of varying sizes. These denticles are classically grouped together and surrounded by a thin, dark radiolucent halo, representing the dental follicle separated the lesion from the surrounding bone. The root of tooth 11 appeared fully formed, with a closed apex, and the crown was directed labially and coronally parallel to the long axis of tooth.



Fig-1 Pre-operative

Diagnosis

Based on clinical and radiographic findings, diagnosis of compound odontome of the anterior maxilla causing impaction of the maxillary right permanent central incisor (tooth 11) was established

Treatment plan

The management strategy for such cases universally involves (1) surgical enucleation of the odontome with meticulous curettage of the associated fibrous capsule, (2) a period of passive eruption observation for six months, and (3) if spontaneous eruption fails, orthodontic traction to guide the impacted tooth into its correct arch position to restore the arch integrity and aesthetics of facial region.

Surgical Procedure

The procedure was performed under local anaesthesia (2% lignocaine with 1:80,000 adrenaline). Preoperative vital signs were within normal limits. Written informed consent was obtained from the legal guardian, and child assent was documented.

A full-thickness conservative mucoperiosteal flap was elevated using a sulcular incision extending from the distal of tooth 11 to the distal of tooth 21, with a single mesial vertical relieving incision adjacent to tooth 12. The flap design avoided violation of the alveolar mucosa labial to the expected position of tooth 11 to preserve the keratinised tissue for future restorative and periodontal health.

Following flap reflection, buccal cortical bone overlying the odontome was carefully removed using a round carbide bur under copious sterile saline irrigation. The odontome was exposed in its entirety. Using a combination of straight elevators and periosteal instruments, the calcified mass was carefully mobilised from the surrounding fibrous capsule without fracturing into the follicular space around tooth 11.

The mass was delivered intact with multiple tooth like structures, measuring approximately 13 × 10 mm. The fibrous capsule lining the bony cavity was meticulously excised using a Molt curette and submitted for histopathological examination. The crown of tooth 11 was visualised in situ; its enamel surface appeared intact and free of any resorptive defects. Haemostasis was achieved, and the surgical site was irrigated with 0.9% sterile normal saline.

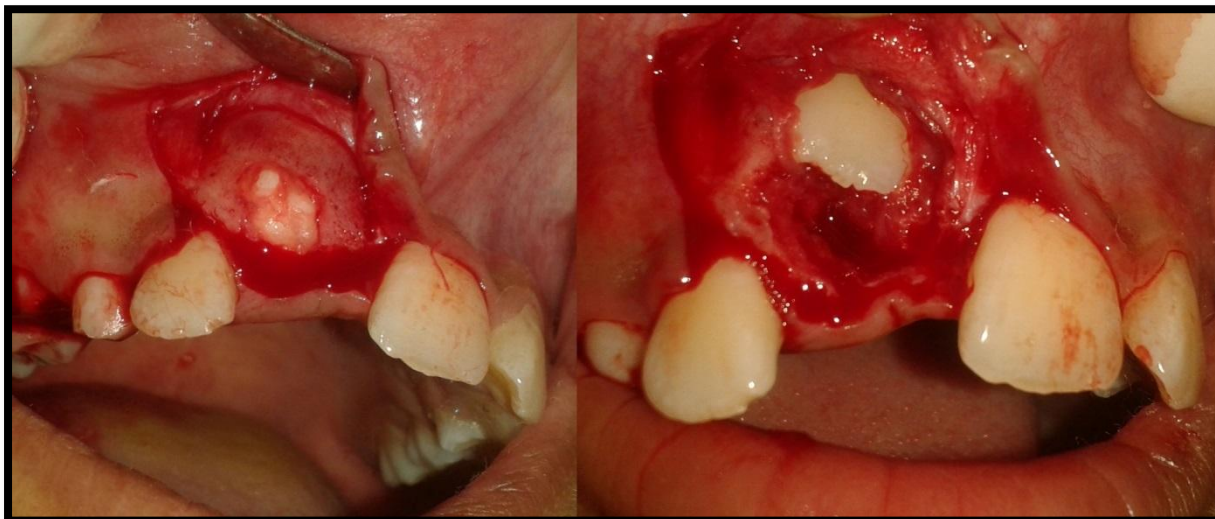


Fig-2 Per-operative Surgical View

The wound was closed with interrupted silk sutures. Postoperative instructions were provided, and the child was discharged on analgesics (ibuprofen 10 mg/kg, 6-hourly for five days) and chlorhexidine gluconate 0.2% mouthwash (twice daily for two weeks).

Histopathological Findings

The excised specimen was fixed in 10% neutral buffered formalin and submitted for routine histopathological study. Histopathological report confirmed it as compound odontome

Postoperative Follow-Up and Observation Period

The child was reviewed at one week (suture removal), one month, three months, and six months postoperatively. At six months, a repeat periapical radiograph demonstrated resolution of the surgical cavity with normal trabecular bone formation. No spontaneous eruption of tooth 11 had occurred; however, the tooth maintained a favourable coronal position approximately at the cemento-enamel junction level of tooth 21.



Fig-3 IOPA at 6 Months

Given the absence of spontaneous eruption beyond six months, orthodontic extrusion was planned.

Orthodontic Extrusion Protocol

The orthodontic extrusion procedure was performed under local infiltration anaesthesia. A scalloped incision of gingiva done labial to impacted 11 tooth maintaining gingival zenith to expose the labial part of 11 tooth for MBT bracket placement. Two molar bands were placed in respect to 16 and 26 teeth. 0.22 MBT brackets were bonded on the labial surface of the 12 21 and 22 teeth maintaining proper recommended position according to MBT method of orthodontic treatment and on exposed labial portion of tooth 11. 0.12 NiTi wire was placed. Patient advised to come after 6 weeks. After 6 weeks, #11 tooth descended vertically when simultaneously mesial angulation of 21 had been corrected. Now bracket over 11 removed and repositioned at

correct position and a 0.14 NiTi wire was placed and patient was advised to come after 6 weeks. After 6 weeks it was seen that 11 came into its correct destined position maintaining proper gingival margin. Then molar bands and MBT brackets were removed and permanent retention provided by palatal wire splinting by composite bonding.

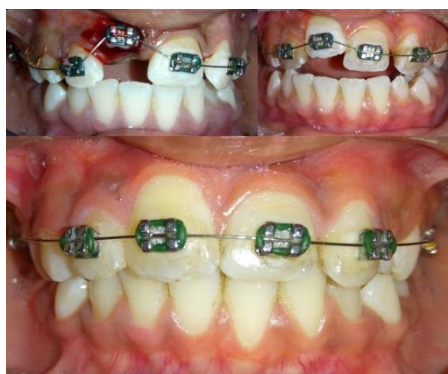


Fig- 4 Orthodontic Extrusion Procedure

Treatment Outcomes

Complete clinical eruption of tooth 11 into its intended arch position was achieved at 3 months after initiation of orthodontic traction (9 months post-surgery). Final clinical evaluation demonstrated the following:

- Clinical crown length of tooth 11: 9.5 mm (vs. 9.2 mm for tooth 21)
- Gingival margin level: within 1 mm of tooth 21 gingival margin
- Probing depth: ≤ 3 mm at all six sites around tooth 11
- Radiographic bone level: within 2 mm of cemento-enamel junction, with intact lamina dura bilaterally
- No clinical evidence of root resorption on periapical radiograph
- Positive response to cold thermal pulp sensitivity testing
- Patient and guardian reported high satisfaction with aesthetic and functional outcomes

A six-monthly recall schedule was established for monitoring tooth vitality, alveolar bone maintenance, and stability of tooth position. No relapse or adverse sequelae were detected at the eighteen-month post orthodontic treatment follow-up.



Fig-5 Post-Operative Occlusal & Frontal view

III. DISCUSSION

Odontomes account for 22–67% of odontogenic tumours in children, with prevalence varying across geographic populations. Their sex distribution is inconsistent, with studies reporting either a slight male predominance or no significant gender difference [5].

Surgical Considerations

Surgical timing plays a key role in treatment success. Early intervention (7–9 years) is preferred because the impacted tooth still has good eruptive potential and responds well to orthodontic forces. Delaying treatment beyond 12 years increases the risk of ankylosis and reduces the likelihood of successful orthodontic eruption [6].

The surgical approach in this case followed established principles: conservative bone removal to preserve the labial cortex, protection of the follicle and crown of tooth 11, complete excision of the fibrous capsule to minimise recurrence, and proper haemostasis.

Although some clinicians recommend immediate surgical exposure and orthodontic attachment bonding after odontome removal, a six-month observation period was chosen in this case because the crown of tooth 11 was intact and exposed after enucleation which allowed for possible spontaneous eruption [7]. If eruption does not occur within 6–12 months, orthodontic extrusion should be started promptly.

Orthodontic consideration

The key biomechanical principles governing successful extrusion include: (1) light, continuous force (20–60 g) to prevent hyalinisation of the periodontal ligament and root resorption; (2) accurate directional guidance of the tooth toward its intended arch position; (3) timely bracket repositioning as the crown emerges into the oral cavity; and (4) avoidance of excessive torque or rotational forces during the eruptive phase [8].

Periodontal Outcomes

Studies by Becker and Chaushu (2015) and Crescini et al. (2009) demonstrated that when the impacted tooth erupts through an intact zone of attached gingiva, the periodontal outcomes are equivalent to normally erupted teeth [8,9]. In the present case, deliberate preservation of the keratinised gingiva labial to tooth 11 during flap design, combined with directed labial traction, ensured an adequate zone of attached gingiva at the completion of treatment.

IV. CONCLUSION

This case report demonstrates that compound odontomes in the anterior maxillary region of paediatric patients can be successfully managed through surgical enucleation followed by a structured orthodontic extrusion protocol.

The keys to success in this interdisciplinary protocol are: (1) preservation of the follicular integrity and labial keratinised tissue during surgery; (2) a light, directionally controlled orthodontic forces not exceeding 60 g; and (3) close multidisciplinary collaboration between oral and maxillofacial surgery, paediatric dentistry, and orthodontics throughout the treatment continuum.

Clinicians should be vigilant for non-erupting maxillary central incisors in the mixed dentition, as early identification and prompt management of obstructing odontogenic pathology can obviate the need for complex prosthetic rehabilitation and preserve the natural dentition for life.

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