

Case Report

Management of Complex Odontoma Causes Delayed Eruption of Lower Right First Permanent Molar: A Case Report

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Abstract

Introduction: Odontomas are considered developmental anomalies that result from defects during the maturation phase of morpho-differentiation. They are the most common type of odontogenic tumours. Typically, they are asymptomatic and are often discovered incidentally during routine radiographic examinations. According to the World Health Organization classification, odontomas are classified into two distinct types: complex and compound. Although these lesions are generally benign, odontomas can occasionally disrupt tooth eruption, leading to issues such as impaction, delayed eruption, or retention of both primary and permanent teeth. This study aimed to describe the dental management of a patient with an odontoma at King Abdulaziz Medical City – Jeddah.

Case Description: The patient was a healthy 10-year-old Saudi boy who presented to the paediatric dental clinic. His father expressed concern regarding the delayed eruption of the lower right permanent first molar. Intraoral examination revealed the absence of the lower right permanent first molar, with tooth-like hard tissue in its place. Panoramic radiography revealed a radiopaque mass, which was subsequently diagnosed as a complex odontoma. Following interdisciplinary consultation among the dental departments, the decision was made to surgically remove the odontoma. The patient was followed up for nearly two years after removal. During this period, the impacted lower right first molar erupted spontaneously, and the occlusion stabilized approximately two years postoperatively.

Conclusion: Early detection and appropriate treatment planning for odontomas are crucial for ensuring optimal patient care and outcomes. By remaining informed, dental professionals can provide effective management and promote long-term oral health in their patients.

Keywords: Paediatric dentistry, Odontoma, Dental management, Root dilacerations

Introduction

The term "odontoma" was introduced by Paul Broca in 1867 to describe tumours formed by the overgrowth of complete or transient dental tissues (1). Odontomas are considered developmental anomalies that result from defects during the maturation phase of morphodifferentiation. These defects arise from the growth of fully differentiated epithelial and mesenchymal cells, which give rise to ameloblasts and odontoblasts (2).

Odontomas are the most common type of benign odontogenic jaw tumours in patients younger than 20 years. These tumours are composed of enamel, dentin, cementum, and pulp tissue (3). According to the World Health Organization classification, two distinct types of odontomas are recognized: complex and compound odontomas (4).

Generally, odontomas have been associated with trauma during primary dentition, as well as with inflammatory and infectious processes, hereditary anomalies (such as Gardner syndrome and Hermann's syndrome), odontoblastic hyperactivity, and alterations in the genetic components responsible for controlling dental development (4).

In complex odontomas, all dental tissues are present but lack an organized structure. In contrast, compound odontomas exhibit an arrangement of all dental tissues into multiple tooth-like structures known as denticles (5). These odontogenic tumours can occur in both dental arches and account for 22% of all odontogenic tumours of the jaw. Notably, approximately 60% of complex odontomas occur in women (6).

Compound odontomas are most often located in the anterior region of the maxilla, while complex odontomas are typically found in the posterior areas, particularly in the mandible (7, 8). Complex odontomas are characterized by painless, slow-growing, and expanding lesions. Compound odontomas, on the other hand, are also painless but exhibit a more aggressive growth pattern, though their growth potential is limited compared to complex odontomas. Both types are usually asymptomatic, slow-growing, and rarely exceed the

size of a tooth; however, when large, they can cause cortical bone expansion (2, 9).

Odontomas are primarily diagnosed during the first two decades of life (10). These tumours are commonly associated with unerupted teeth, with canines and upper central incisors being the most frequently impacted, followed by third molars (11). While these malformations are generally intraosseous, they rarely erupt into the oral cavity (12).

Compound odontomas are often linked to impacted adjacent permanent teeth, and surgical removal is considered the best treatment option. The prognosis after treatment is favourable, with a low incidence of recurrence (4, 5). Although odontomas may initially be asymptomatic, they can cause eruption anomalies in the affected teeth as they grow, presenting as a bulge in the oral cavity. This often prompts patients to seek dental care, where radiographic examinations reveal the presence of an odontoma (13, 14).

The primary treatment method is surgical removal (15). Although these lesions are benign, odontomas can occasionally lead to complications in tooth eruption, including impaction, delayed eruption, or retention of primary and permanent teeth (16-18).

This case report describes a minimally invasive surgical procedure used to remove a complex odontoma located in the posterior area, associated with an unerupted permanent mandibular first molar (tooth #46). The goal of this technique is to preserve as much surrounding bone tissue as possible to promote healing, minimize postoperative discomfort, particularly in a young patient, and allow the eruption of strategic tooth #46.

Case Presentation

A 10-year-old healthy Saudi boy presented to the paediatric dental clinic at King Abdulaziz Medical City Hospital, part of the National Guard, in Jeddah. His father was concerned about the delayed eruption of the lower right permanent first molar. Intraoral examination revealed fair oral hygiene and no visible carious lesions. The boy was in the late mixed dentition stage, had an increased overjet, and

was missing the lower right permanent first molar. In its place, a tooth-like hard tissue was exposed and surrounded by slight gingival inflammation (**Figure 1**).



Figure 1: Intraoral examination showing late mixed dentition stage with missing lower right permanent first molar and exposed tooth-like hard tissue in its place (blue arrow). Clinical intraoral preoperative photographs of the patient. A) Occlusal view of the maxillary arch showing the late mixed dentition. B) Right lateral view of the dentition. C) Frontal view of the dentition. D) Left lateral view of the dentition (E) Occlusal view of the mandibular arch with a blue arrow pointing to the missing lower right permanent first molar and exposing a tooth-like, hard tissue in its place.

According to the American Academy of Paediatric Dentistry (AAPD) guidelines, orthopantomographs and selected periapical radiographs were obtained (19). The images showed a radiopaque mass measuring approximately 0.5 cm in diameter (**Figure 2**). The lesion had well-defined borders and was located close to the occlusal surface of the lower right permanent first molar (#46). The root of tooth #46 was nearly developed and showed dilaceration near the lower border of the mandible. Based on these findings, a provisional diagnosis of a complex odontoma was made.

Owing to the deep position of the impacted tooth #46 and the potential risk of inferior alveolar nerve injury during surgical removal, Cone Beam Computed Tomography (CBCT) was requested. Consultations were conducted with both the orthodontic and oral and maxillofacial surgery departments. The CBCT findings indicated minimal risk to the inferior alveolar canal, leading to the decision to remove the odontoma and monitor the eruption of tooth #46 every three months.

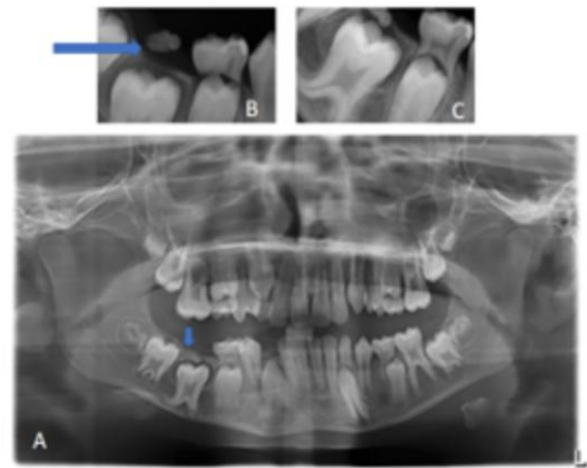


Figure 2: Panoramic and Periapical radiographs showing impacted lower permanent first molar tooth #46 with an odontoma blocking the eruption pathway of tooth #46 (blue arrow); A) panoramic radiograph showing the overall dental and jaw structures; (B, C) periapical radiograph (right side) showing an odontoma blocking the tooth #46 eruption pathway (blue arrow).

Under local anaesthesia and with an elliptical incision, the odontoma was surgically removed at the paediatric dental clinic in collaboration with the Maxillofacial Surgery Department, without any premedication (**Figure 3**). The wound was carefully irrigated with physiological saline and cleaned with a sterile dressing. The flap was repositioned and sutured with 3-0 absorbable sutures. The diagnosis of complex odontoma, a rare finding in young children, was confirmed histopathologically.

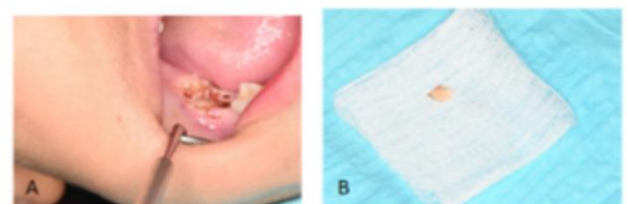


Figure 3: Clinical photographs of the surgical removal of the odontoma. A) Intraoral view of the surgical exposure of the odontoma. B) Part of the odontoma after surgical removal.

Postoperative care included amoxicillin–clavulanic acid (1 g twice daily for 5 days), paracetamol (500 mg twice daily for 2 days, as needed), and

chlorhexidine digluconate (0.2%) spray. The postoperative period was uneventful.

The crown of the first molar began to erupt approximately six months after the removal of the odontoma. Tooth #46 erupted spontaneously, indicating the presence of an eruptive force despite complete root formation and root dilaceration.

The patient was followed up for nearly one year after odontoma removal. During this period, the lower right first molar (#46) fully erupted and the occlusion stabilized (**Figure 4, 5**). The patient was then referred to an orthodontist for further treatment.



Figure 4: Intraoral examination showing the permanent dentition stage with an erupted lower right permanent first molar tooth (#46) after 2-year follow-up (blue arrow). Clinical intraoral postoperative photographs of the patient. A) Occlusal view of the maxillary arch showing permanent dentition. B) Right lateral view of the dentition. C) Frontal view of the dentition. D) Left lateral view of the dentition. E) Occlusal view of the mandibular arch with a blue arrow pointing to the erupted lower right permanent first molar.



Figure 5: Panoramic radiograph showing the erupted lower right permanent first molar tooth #46 after the removal of the odontoma (blue arrow).

Discussion

Odontomas are the most common odontogenic tumours. They can occur at any age but are most frequently diagnosed in the first two decades of life, with a mean age of 14–18 years. They are slightly more common in females and are more often found in the maxilla, especially the anterior maxilla, than in the mandible (4, 20). In our case, an odontoma was diagnosed at the age of 10 years in a male patient, located in the posterior region of the mandible.

The exact etiology of odontomas remains unknown (10). Proposed etiological factors include mutant genes, odontoblastic hyperactivity, inflammatory or infectious processes, and trauma to the primary dentition. Certain hereditary conditions, such as Gardner's syndrome and Hermann's syndrome, have also been associated with odontomas (7). Persistence of a portion of the dental lamina during tooth development can result in the formation of either a compound or complex odontoma (6).

Multiple studies suggest that odontomas may be underreported, as they are typically asymptomatic and often detected incidentally on panoramic radiographs, an imaging modality that is still not routinely performed in many clinical settings (3, 17). Their asymptomatic nature, combined with inadequate clinical and radiographic assessments in paediatric patients, can delay diagnosis. In our case, the father's chief complaint prompted a complete clinical and radiographic examination in accordance with the American Academy of Paediatric Dentistry (AAPD) guidelines, which are mandatory for all new patients during initial and recall visits at our centre. This approach facilitates the timely diagnosis of lesions.

Radiographically, odontomas typically present as well-circumscribed radiolucent areas resembling dental follicles or dentigerous cysts. In many cases, radiographic features are sufficient to classify lesions (1, 5). Radiologically, odontomas are classified into two types: complex and compound. Complex odontomas are less common, with a ratio of approximately 1:2, compared to compound odontomas. Compound odontomas are more

frequently found in the anterior jaws, whereas complex odontomas are more common in the posterior jaws (4). They often cause tooth impaction or delayed eruption (1, 2). In our patient, a complex odontoma in the posterior mandible blocked the eruption pathway of the lower right permanent first molar (#46).

Clinically, odontomas can be categorized as intraosseous or extraosseous (also referred to as central or peripheral odontomas, respectively). Intraosseous odontomas are located within the bone and may rarely erupt into the oral cavity, whereas extraosseous odontomas are extremely rare and develop within soft tissues. In the literature, several cases of erupted odontomas have been reported, most often associated with pain and infection of the surrounding mucosa, as occurred in our patient (17, 20).

The differential diagnoses for odontomas include ossifying fibroma, cementoblastoma, and ameloblastic fibro-odontoma. The radiopacity of ossifying fibromas is more mottled and less dense than that of odontomas. Cementoblastomas are always fused to the roots of the associated teeth. Ameloblastic fibro-odontomas typically display a larger radiolucent component than the thin radiolucent halo observed around odontomas (6).

Odontomas are most often diagnosed during radiographic evaluations for missing or malpositioned teeth, particularly in the permanent dentition rather than in the deciduous dentition (17). When an impacted tooth has adequate space for eruption in the dental arch, surgical removal of any obstructing gingiva or odontoma should be performed, followed by a three-month observation period. Orthodontic traction should be considered if a tooth fails to erupt. In cases with insufficient space, orthodontic intervention may be required to upright adjacent teeth and create space. If an eruption is not expected, extraction of the impacted tooth may be indicated (13). In our case, tooth #46 began to erupt spontaneously six months after surgery. Long-term follow-up was essential, and at the two-year review, tooth #46 was in its normal position in the dental arch.

This study is limited by its design as a single case report, which does not allow the generalization of the treatment approach to all odontoma cases with unerupted teeth in paediatric patients. However, long-term follow-up allowed for the evaluation of treatment outcomes.

Early diagnosis and surgical removal of odontomas can prevent eruption disturbance. Careful follow-up, incorporating preventive and interceptive orthodontics, when necessary, can help avoid future malocclusions.

Conclusion

Odontomas are common benign tumours of odontogenic origin that require prompt recognition and management. Early detection, accurate diagnosis, and appropriate treatment planning are essential for achieving optimal patient outcomes. Staying informed about current research and adhering to evidence-based clinical guidelines enables dental professionals to deliver effective management and ensure the long-term oral health of their patients.

Disclosure

Ethical committee approval

Ethical approval for this case report was obtained from the Institutional Review Board of King Abdullah International Medical Research Centre (IRB No. IRB NRJ24/020/12. Written informed consent was obtained from the father.

Competing interests

The authors declare that they have no competing financial, professional, or personal interests that might have influenced the performance or presentation of the work described in this case report.

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