Case report

Compound odontomas – A roadblock to tooth eruption and shedding: A case series

Pratima R. Mokashi, Srikala Bhandary, Rajmohan Shetty

Nitte (Deemed-to be University), AB Shetty Memorial Institute of Dental Sciences (ABSMIDS)
Department of Paediatric and Preventive Dentistry, Mangalore, 575018, Karnataka, India

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Corresponding author: **Srikala Bhandary.** Email: drsrikalabhandary@nitte.edu.in

ABSTRACT

The most prevalent type of odontogenic tumours are odontomas, which are typically asymptomatic. This study describes three cases of compound odontomas identified in children as a result of dislodgement or over-retention of primary anterior teeth and/or swelling of the cortical bone. In each of these situations, the lesions were surgically excised. The outcomes obtained show that an early detection of odontomas enables the use of a less expensive and complex treatment and ensures a better prognosis. This article provides in-depth information on the categorization, prevalence, diagnosis, treatment, and epidemiology of odontomas, which interfere with the patterns of tooth eruption and shedding as well as overall occlusion.

Keywords: Odontoma; odontogenic tumours; excision.

INTRODUCTION

Paul Broca initially used the term "odontoma" in 1866, defining it as a tumour created by the proliferation of all dental tissue. Developmental abnormalities known as odontomes are caused by the emergence of fully differentiated epithelial and mesenchymal cells, which give rise to active ameloblast and odontoblast (1). Perhaps a hamartoma rather than a genuine neoplasm is a more fair description of the odontomas (2).

According to the second edition of the WHO histologic typing of odontogenic tumors, odontomas are categorised under tumors containing odontogenic epithelium with odontogenic ectomesenchyme, with or without dental hard tissue formation. Three distinct odontomas are described in this classification: Odontoameloblastoma, Complex, and Compound odontoma (3). H.M. Worth(4) classified odontomes on the basis of the germ layers as Enameloma (ectodermal origin), Dentinoma and Cementoma (mesodermal origin) and Complex composite odontome, compound composite odontome, geminated odontome, including dens in dente (mixed ectodermal and mesodermal origin).

Compound and complex odontomas are the two forms of odontomas recognized by the WHO classification of odontogenic tumours in 2005 (3). According to their clinical presentation, odontomas can also be divided into three categories: central (which occurs inside the bone), peripheral (which occurs in the soft tissue covering the tooth-bearing portion of the jaws), and erupted odontomas (5). Odontomas can present at any age, however the majority are discovered in the first two decades of life. The majority of lesions are found on routine radiographs, and there is no gender preference (6). Budnick observed increased frequency of occurrence in men (59%) as opposed to women (41%). 33 percent of the odontomas occurred in the mandible, and 67 percent occurred in the maxilla (7). A common site of appearance for compound odontome is the incisor-canine region of the maxilla, while complex odontomes are frequently found in the premolar-molar region of both jaws (8). These malformations are usually intraosseous, but they may erupt into the oral cavity (9).

Case series

Case 1:

An 11 year old boy visited the department of Paediatric and Preventive Dentistry with the complaint of multiple unerupted teeth in the upper anterior region. The medical, dental and family histories were non-contributory. On intraoral examination, the maxillary right central incisor was clinically absent, despite eruption of the contralateral tooth in its normal position in the dental arch. The mucosa overlying the edentulous region appeared normal without signs of swelling or inflammation (Fig.1A). On radiographic examination, the maxillary right central incisor was found to be impacted with a small tooth like radio-opaque structure enveloping its coronal surface, which was surrounded by a thin radiolucent zone (Fig. 1B). A provisional diagnosis of compound odontome on the basis of the clinical and radiographic examination. The treatment involved conservative surgical excision of the tooth like structure followed by periodic clinical and radiographic evaluation.

Local anaesthesia was achieved by using 2% lignocaine with 1 : 100 000 epinephrine. Extraction of 51 and 52 was carried out. A mucoperiosteal flap on the labial surface from 51 to 53 was raised

(Fig.1C), on the labial surface. The calcified tooth-like structure was resected along with fibrous tissue covering without disrupting the unerupted permanent incisor (Fig.1D). The excision was followed by careful curettage and irrigation with povidone iodine-saline solution. The flap was approximated with 3-0 silk sutures once haemostasis was achieved. The specimen obtained was preserved in 10% formalin and sent for histopathological examination. This confirmed the diagnosis of compound odontome. The sutures were removed after one week of placement, after which normal healing was observed.

Fig. 1A: Normal mucosa without any signs of inflammation

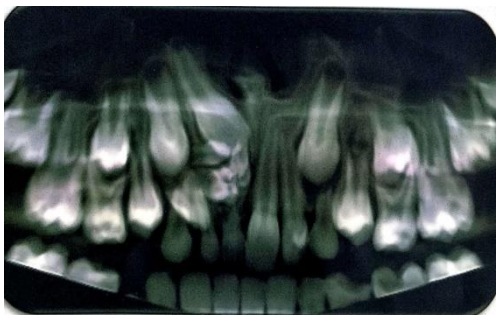

Fig. 1B: Radiograph showing impacted maxillary right central incisor associated with a small tooth-like radio-opaque structure

Fig. 1C: Mucoperiosteal flap on the labial surface from 21 to 53 was raised

Fig.1D: Calcified tooth-like structure removed

Case 2:

A 9 year old boy presented with the complaint of a non- tender swelling in the left upper front region since 4 years. His medical, dental and family histories were non-contributory. On intraoral examination, a well defined, round, soft, non-fluctuant, non-tender swelling and single tooth crossbite with respect to 21 were observed (Fig.2A). The radiographic examination revealed that small tooth-like radio-opaque structure overlapping its coronal portion of 21 and was enveloped by a thin radiolucent zone (Fig.2B). On the basis of the clinical and radiographic examination, a provisional diagnosis of compound odontome was made. The treatment of choice was conservative excision of the tooth like structure followed by regular clinical and radiographic evaluation. The combination of 2% lignocaine with 1:100000 epinephrine was used to produce local anaesthesia. A mucoperiosteal flap was raised on the labial surface from 11 to 21. A total of 4 calcified tooth like structures were elevated and retrieved (Fig. 2C). The flap was approximated with 3-0 silk sutures once hemostasis was achieved. The sample obtained was preserved in 10% formalin for histopathological analysis, which confirmed the diagnosis of compound odontome. The sutures were removed after a week, which was followed by normal healing.

Fig.2A: Swelling and single tooth crossbite with respect to 21

Fig.2B: Radiograph showing small tooth-like radio-opaque structure

Fig.2C: Calcified tooth like structures were removed

Case 3:

A 9 year old boy reported to the clinic with the complaint of unerupted tooth in the anterior region. His family, medical and dental histories were non-contributory. On examination, the clinical absence of maxillary left central incisor was observed, while the contralateral tooth had already erupted and was normally positioned in the arch. Overlying mucosa covering the edentulous region was normal without any signs of swelling or inflammation (Fig.3A). Radiographic image of multiple small tooth like hyper dense structures surrounded by hypodense periphery noted. Situated between the root of 21, apical to the crown of 11 lying 6.12 mm to occlusal plane and 13mm apical to crest (Fig.3B). Teeth within the lesion showing distinct enamel, dentin and pulp chambers and root canals. Findings consistent with Compound Composite Odontome. On the basis of the clinical and radiographic examination, a provisional diagnosis of compound odontome was made. The treatment included conservative removal of the tooth like structure followed by periodic clinical and radiographic evaluation.

Local anaesthesia was achieved by using 2% lignocaine with 1 : 100 000 epinephrine. A flap on the lingual surface from 21 to 22 was raised. The calcified tooth mass was removed by means of elevation and a 2 minute calcified structures were removed. As the 21 showed root formation of more than half their length ,the teeth were allowed for spontaneous eruption and no orthodontic intervention was chosen to be done. Sutures were placed and a monthly follow up appointment schedule was chalked (Fig. 3C).

Fig. 3A: Normal mucosa without any signs of inflammation

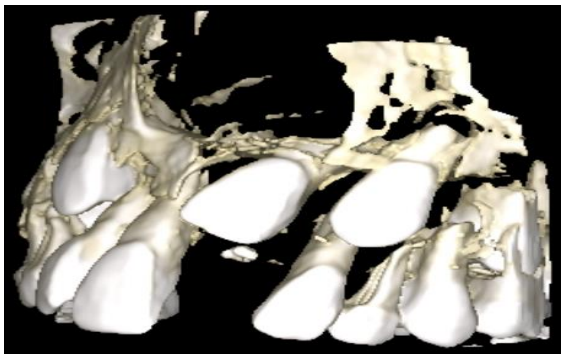

Fig. 3B: Radiographic image of multiple small teeth like hyper dense structures

Fig. 3C: Sutures placed

Radiographic investigation

On radiographic examination, complex odontomes present as an irregular radiopacity, which may be spherical or ovoid, with a fine radiating periphery. This is encircled by a radiolucent zone, which may appear broader in a developing complex odontome. On the other hand, compound odontomes manifest as a collection of tooth like structures which are enveloped by a radiolucent zone. Three distinct developmental stages can be observed radiographically based on the degree of odontome classification. These include- first stage where the lesion appears radiolucent as calcification of dental structures is absent; the intermediate stage presents with partial calcification of the dental tissues; and the final stage where the odontome exists as a radio-opaque mass which is surrounded by a fine radiolucent halo (10).

Histological investigation

On histopathological examination, the enamel matrix may appear normal. Dentin, pulp tissue and cementum may or may not have a normal relation to one another. If the calcified structure resembles the tooth morphologically, it is generally single rooted. Complex odontomes consist of loose connective tissues which enclose strands or islands of odontogenic epithelium. In the outer portion of the developing complex odontomes, a cell rich zone of soft tissue is present which forms dentin and enamel that does not resemble the tooth morphology. This lesion presents as a mass of primary tubular dentin, which encompasses hollow circular or oval structures with empty spaces, which may be derived from decalcified mature enamel, enamel matrix producing epithelium and connective tissue. The exact structure of this calcified mass may vary. It mainly consists of wavy and plicated walls of tubular or dysplastic dentin covered by enamel. Amidst these walls, irregular, curvilinear clefts are present which contain epithelium that produces enamel matrix and connective tissue. Cementum is scarcely present, except on the root portion of these calcified structures. Few ghost cells may be scattered. The sample of compound odontome exhibits a variable number of tooth like structures enclosed in a thin fibrous capsule, as seen in mature odontomes. The connective tissue capsule around the odontome is similar to the follicle surrounding a normal tooth (11).

DISCUSSION

Odontomes are usually treated by conservative surgical enucleation with little possibility of its relapse. When the lesion is excised at its non-calcified tissue stage, the chances of recurrence is higher. Furthermore, they are easily enucleated since it involves separation from adjacent teeth by the septum of the bone. Despite having limited growth potential, the removal of odontomes is mandatory due to the presence of various tooth malformations which may predispose to cystic change, and may disrupt the normal eruption of permanent teeth. This may further cause considerable bone destruction. All paediatric patients clinically presenting with delayed tooth eruption or temporary tooth displacement, with or without history of dental trauma should undergo radiographic examination (12, 13).

The three clinical instances of compound odontomes linked with immature permanent teeth in young patients are described in this research. Impaction has been characterised as the delay in a tooth's eruption to the anticipated time into a proper functional position (frequently caused by a physical obstacle). Lack of space, deformity from early trauma, mechanical obstruction such a supernumerary tooth, odontome, other odontogenic tumours and cysts, or scar tissue from an early primary tooth loss are probable causes of failure of eruption. In the situations that were shown, compound odontomes were linked to immature permanent teeth and served as the clear cause for delaying their eruption.

Odontomes are encapsulated, confined tumours that can be successfully removed by conservative surgery. Numerous authors have reported that the impacted tooth can spontaneously erupt after an obstruction-like odontome has been removed. Others support a less cautious method that exposes the unerupted tooth during surgery and places bonded attachments and ligatures/e-chains for orthodontic tension to speed up eruption. However, this strategy could lead to a weak gingival margin, insufficient attachment of the gingival tissue, and a difference in gingival level between the exposed tooth and its neighbouring teeth. As a result, we recommended a more cautious approach in the current case and advised removing the odontome and its fibrous capsule while allowing the unerupted teeth to do so spontaneously (14).

CONCLUSION

Although there is abundant literature on the presence of odontome, they are more common in the anterior region as compound composite odontome. Compound odontomes exhibit great predilection for the anterior maxilla, as this region presents conditioned hyperactivity of the dental lamina favouring the development of compound type of odontomes and supernumerary teeth. Early diagnosis and correct treatment are essential to avoid any complications, such as prolonged retention of primary teeth and delayed eruption of permanent teeth.

CONFLICT OF INTEREST

Authors have no conflicts of interest.

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