

Impaction of Maxillary Central Incisor due to Complex Odontoma

Prima Andisetyanto¹, Ratna Indriyanti², Iwan Ahmad³, Kirana Lina Gunawan⁴, Risti Saptarini Primarti⁵,
Inne Suherna Sasmita⁶

^{1,2,3,4,5,6}Universitas Padjadjaran, Faculty of Dentistry, Pediatric Dentistry Department, Sekeloa Selatan Road 1st Bandung, West Java, Indonesia 40132

Abstract: Odontomas are mixed odontogenic tumors in which both the epithelial and mesenchymal components undergo functional differentiation and form enamel and dentin. It is the most common type of odontogenic tumors and generally they are asymptomatic. Odontomas frequently interfere with eruption of teeth leading to their impaction. This is a case report of a 11-year-old girl with an unerupted maxillary left central incisor due to a complex odontoma. The purpose of this article is to present and discuss the case of unerupted left maxillary permanent central incisor. Radio opaque calcified masses were revealed in the panoramic radiograph and CBCT. The masses were surgically removed to facilitate the eruption of the tooth, with the palatal approach anterior superior alveolar (P-ASA) nerve block technique of anesthesia.

Keywords: complex odontoma, impacted incisor, minor surgery.

1. Introduction

The term "Odontoma" was coined by Paul Broca in 1867. Odontomas are mixed odontogenic tumors in which both the epithelial and mesenchymal components undergo functional differentiation and form enamel and dentin.¹ Similar to teeth, once fully calcified, they do not develop further.² They are hamartomatous lesions rather than true neoplasms.³ Odontomas generally consist of unerupted or impacted teeth and retained deciduous teeth. Although rare, but there may be spontaneous eruption of an odontoma into the oral cavity which leads to pain and inflammation of adjacent soft tissues and can be confused with some bony lesion.⁴

The majority of odontomas are asymptomatic and seldom cause swelling, pain, suppuration, bony expansion and displacement of teeth.⁵ These lesions are commonly small, seldom larger than a tooth. Odontomas are generally discovered through routine radiographic examination in dental treatment.⁶ An odontoma is essentially a benign lesion, but often causes disturbances in the eruption of its associated tooth.⁷ According to WHO classification,⁸ odontomas can be divided into three groups,

- 1) Complex odontoma: when the calcified dental tissues are simply arranged in an irregular mass bearing no morphologic similarity to rudimentary teeth. Complex odontoma constitute about 5 to 30% of all odontogenic tumors of the jaws. They are usually detected in school-age children, and the mean age at the time of diagnosis is 14 years.⁹
- 2) Compound odontoma: composed of all odontogenic tissues in an orderly pattern that results in many tooth-like structures, but without morphologic resemblance to normal teeth.
- 3) Ameloblastic fibro-odontoma: consists of varying amounts of calcified dental tissue and dental papilla-like tissue, the later component resembling an ameloblastic fibroma. The ameloblastic fibro-odontoma is considered as an immature precursor of complex odontoma.

Clinically, three types of odontomas are recognized in the literature: central (intraosseous) odontoma, peripheral (extraosseous or soft tissue) odontoma, and erupted odontoma. Intraosseous (central) odontomas are the odontogenic tumors of greatest incidence. According to Daley et al., they represent 51% of all odontogenic tumors.¹⁰ Central odontomas occur predominantly in the anterior maxilla (the usual location of compound lesions) and mandibular molar regions (the most common location of complex lesions).¹¹ Peripheral or extraosseous odontomas are defined as tumors with the histological characteristics of intraosseous odontoma but occurring only in the soft tissue covering the tooth-bearing portion of the mandible and maxilla. Rarely, intraosseous odontomas located coronally to an erupting or impacted tooth or superficially in bone may facilitate their eruption into the oral cavity. These lesions have traditionally been referred to as erupted odontomas.¹²

The etiology of this malformation is not yet known, but there is some evidence to show that there is a genetic basis for both complex and compound odontomas. Heredity is a possible factor and persistent lamina could be the hidden inherited developmental anomaly. Other theories have been proposed, including local trauma, infection, family history, and genetic mutation.²

2. Case Report

An 11-year-old female patient reported with a complaint of unerupted tooth in the upper front region of the jaw. Past family and medical histories were not relevant. Her general medical history was noncontributory. Intraoral examination revealed a permanent dentition with unerupted left maxillary permanent central incisor. On inspection, a swelling was noticed on the labial side of the unerupted tooth (Figure 1). A firm nodule measuring approximately 1 cm in diameter in the same region was palpated.

Panoramic radiograph and CBCT revealed that radiopaque structures were present obstructing the eruption of left maxillary permanent central incisor (Figure 2 and 3). The

patient was subjected to surgical removal of the odontoma under local anesthesia. Computer-controlled local anesthetic delivery (CCLAD) is used for painless anesthesia, with palatal approach-anterior superior alveolar (P-ASA) nerve block technique to provides anesthesia to the six anterior teeth – canine to canine bilaterally as well as the palatal and labial gingiva and muco-periosteum and bone overlying anterior teeth (Figure 4-A).



Figure 1: Intra Oral Examination. (A) Labial view

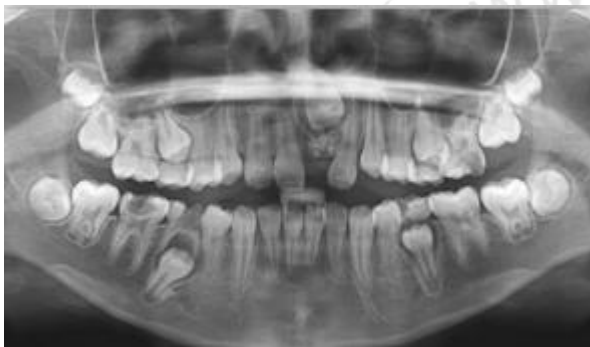


Figure 2: Panoramic Radiograph

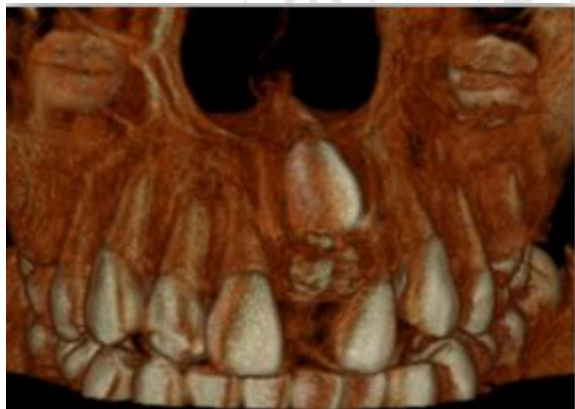


Figure 3: Cone Beam Computed Tomography

Full thickness mucoperiosteal flap was reflected from the labial surface of right maxillary permanent central incisor to left maxillary lateral permanent incisor. The layer of bone overlying the mass was removed and the calcified masses were exposed (Figure 4-B). The masses were removed without disturbing the underlying tooth (Figure 5). Curettage was done and the area was irrigated with povidone iodine solution and normal saline (0.9%). Unerupted left maxillary permanent central incisor was located. The flap was repositioned and sutured.



Figure 4: (A) Palatal Approach-Anterior Superior Alveolar (P-ASA) Nerve Block Technique, (B) Bone Removal, (C, D) Removing The 'Denticle'

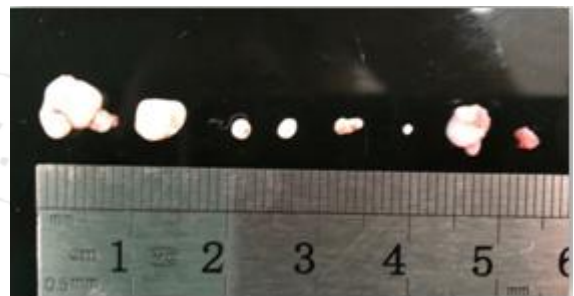


Figure 5: The Denticle

3. Discussion

In clinical setting, dentists often encounter the problem of tooth impaction, which has been defined as a situation where a tooth fails to erupt into a normal functional position by the expected times. For tooth impaction, numerous local etiologic factors have been described. These include odontomas, odontogenic tumors, ankylosis, trauma and dentigerous cysts. Among these factors, odontoma is the most common etiological factor.¹³ The complex odontoma occurs predominantly in the second and third decades of life and the majority arises in the molar region of the mandible. They are often associated with the crowns of unerupted teeth and occasionally may take the place of a tooth. For these reasons they may be discovered, when small, as incidental findings when investigating a patient with a tooth missing from the dental arch.²

The odontoma in this case presents as a well-defined radiopacity situated in bone, but with a density that is greater than bone and equal to or greater than that of a tooth. It contains foci of variable density. A radiolucent halo, typically surrounded by a thin sclerotic line, surrounds the radiopacity. The radiolucent zone is the connective tissue capsule of a normal tooth follicle. The thin sclerotic line resembles the corticated border seen in a normal tooth crypt. The developmental stages can be identified based on radiologic features and the degree of calcification of the lesion at the time of diagnosis. The first stage is characterized by radiolucency due to the absence of dental tissue calcification, the second or intermediate stage shows partial calcification and the third or classically radiopaque stage exhibits predominant tissue calcification with the surrounding radiolucent halo.^{14,15}

The exact etiology of odontoma is unknown. However, it has been suggested that trauma and infection may lead to the development of such a lesion. It had been suggested by Hitchin, that odontomas are inherited or are due to a mutagenesis or interference, possibly postnatal, with the genetic control of tooth development. The etiology of odontoma is that most result from extraneous odontogenic epithelial cells. When these buds are divided into several particles, they may develop individually to become numerous, closely positioned malformed teeth or tooth-like structures. When the buds develop without such uncommon division and consists of haphazard conglomerates of dental tissues, they may develop into complex odontomas. However, the transition from one type to another is commonly associated with varying degrees of morpho-differentiation or histodifferentiation or both, and it is often difficult to differentiate between both the types.

In this case, the overlying odontomas were surgically removed and the impacted central incisor has been kept under observation to monitor its eruption. If the root of the impacted tooth is still developing, the tooth may erupt normally; but, once the root apex has closed, the tooth has lost its potential to erupt. Interestingly, orthodontic therapy is not usually necessary and is not applied to improve the malocclusion caused by odontoma after extirpation of the tumor. The reason is that most odontomas are very small, and the influence of the tumor on occlusion might be improved without orthodontic therapy.

Hisatomi et al reported that, the impacted tooth tended to erupt regardless of the degree of root formation after extirpation of the odontoma interfering with tooth eruption, although some teeth showed crowding.¹¹ In the case presented, root formation of the impacted incisor was not complete. Therefore, it is anticipated that impacted left maxillary permanent central incisor may erupt spontaneously. However, there have also been some reports about orthodontic therapy which might lead the impacted permanent tooth to a satisfactory postoperative occlusion.

4. Conclusion

In conclusion, most odontomas were found in the second decade of life on routine radiographic examination and they could cause impaction of the adjacent permanent teeth. Early detection and treatment of odontomas could increase the possibility of preservation of the impacted teeth through various treatments. Therefore, periodic panoramic examination in the first and second decades of life would be recommended for the early detection and better prognosis of odontomas. The treatment for odontoma in both primary and permanent dentition is their surgical removal. If odontoma are extirpated early without disturbing the underlying tooth germ, the eruption of the impacted teeth can then be expected spontaneously or after orthodontic traction.

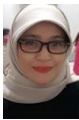
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Author Profile



Prima Andisetyanto (Indonesia) received DDS from Padjadjaran University in 2012. He continued to specialist program in Pediatric Dentistry in Padjadjaran University since 2016 and graduated in 2019. He is a lecturer in Department of Pediatric Dentistry of Dentistry Faculty, Padjadjaran University, Indonesia.



Ratna Indriyanti (Indonesia) received DDS from Padjadjaran University in 1992. She continued to specialist program in Pediatric Dentistry in Padjadjaran University and graduated in 2006. She is a lecturer in Department of Pediatric Dentistry of Dentistry Faculty, Padjadjaran University.



Iwan Ahmad (Indonesia) received DDS from Padjadjaran University in 1990. He continued to specialist program in Pediatric Dentistry in Padjadjaran University and graduated in 2003. He is a lecturer in Pediatric Dentistry Department in Faculty of Dentistry, Padjadjaran University, Indonesia.



Kirana Lina Gunawan (Indonesia) received DDS from Padjadjaran University in 1977. She continued to master program in Padjadjaran University since 2008 and graduated in 2011. She is a lecturer in Department of Oral Surgery of Dentistry Faculty, Padjadjaran University.



Risti Saptarini Primarti (Indonesia) received DDS from Padjadjaran University in 1996. She continued to specialist program in Pediatric Dentistry in Padjadjaran University and graduated in 2006. She finished her doctorate degree from Padjadjaran University in 2010. She is a lecturer in Pediatric Dentistry Department in Faculty of Dentistry, Padjadjaran University, Indonesia.



Inne Suherna Sasmita (Indonesia) received DDS from Padjadjaran University in 1988. She continued to specialist program in Pediatric Dentistry in Padjadjaran University and graduated in 2000. She finished her doctorate degree from Padjadjaran University in 2010. She is a Professor in Pediatric Dentistry Department in Faculty of Dentistry, Padjadjaran University, Indonesia.

