Open Access Library Journal
2024, Volume 11, e12600
ISSN Online: 2333-9721
ISSN Print: 2333-9705

Spontaneous Eruption of an Impacted Second Mandibular Molar after Marsupialization of a Large Dentigerous Cyst in an 11-Year-Old: A Case Report

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How to cite this paper: Moujoud, C., Bouzoubaa, S.M., Nadour, S., Alaoui Bouhamid, A. and Ben Yahya, I. (2024) Spontaneous Eruption of an Impacted Second Mandibular Molar after Marsupialization of a Large Dentigerous Cyst in an 11-Year-Old: A Case Report. *Open Access Library Journal*, **11**: e12600.
https://doi.org/10.4236/oalib.1112600

Received: November 8, 2024
Accepted: December 17, 2024
Published: December 20, 2024

Abstract

Dentigerous cysts are developmental odontogenic cysts commonly associated with unerupted teeth, particularly in the mandible. This report presents a case of a large dentigerous cyst incidentally discovered in an 11-year-old patient during a routine orthodontic examination, involving an impacted second mandibular molar. A conservative approach using marsupialization was chosen to preserve adjacent anatomical structures and promote bone regeneration. Over a 15-month follow-up period, spontaneous eruption of the impacted molar was successfully achieved without complications to surrounding tissues and without the need for orthodontic traction. This case highlights the effectiveness of marsupialization in managing large mandibular cysts in pediatric patients, allowing natural tooth eruption and minimizing the necessity for invasive surgical procedures.

Subject Areas

Dentistry

Keywords

Marsupialization, Dentigerous Cyst, Spontaneous Eruption

1. Introduction

Dentigerous cysts rank as the second most prevalent cystic lesion affecting the mandibular area. They comprise approximately 20% to 24% of all jaw cysts and

commonly involve impacted or unerupted permanent teeth, supernumerary teeth, odontomas, and occasionally primary teeth. The incidence of dentigerous cyst development is estimated at 1.44 per 100 unerupted teeth [1]-[5]. According to the World Health Organization's definition, a dentigerous cyst (DC) is characterized by the encasement of an unerupted tooth's crown, extending to its cementoenamel junction [4]. They are typically found in the posterior region of the mandible, with the mandibular third molars being the most frequently affected, followed by the maxillary canine and maxillary third molars. They are more common in males than females and are more prevalent in individuals of Caucasian ethnicity than those with darker skin tones. Generally, they are observed during the second and third decades of life [1] [3] [5].

Dentigerous cysts originate from an alteration in the development of the reduced enamel epithelium organ, leading to a buildup of fluid between this epithelium and the crown of the permanent tooth. There are two theories explaining the association of these cysts with the lower primary second molars. The first theory suggests that the second molar is more prone to caries, while the second theory proposes that the germ of the primary second molar is in closer proximity to the permanent premolar [1].

In most cases, dentigerous cysts are asymptomatic and are typically diagnosed incidentally during routine radiological examinations. However, in rare instances, these cysts can become secondarily infected, and patients may present with symptoms such as swelling and pain. Radiographically, dentigerous cysts manifest as well-demarcated, unilocular radiolucencies located at the cementoenamel junction of the tooth. They may exhibit radiographic features similar to those of an odontogenic keratocyst or ameloblastoma [1]-[3] [5].

Different treatment options have been recommended for the management of these cysts, such as repairing damage to the affected permanent tooth, excising all pathological tissues along with the removal of the involved tooth, or marsupialization. Among these options, marsupialization stands out as a highly beneficial method for treating oral cysts due to its preservation of natural structures and minimally invasive nature. Additionally, marsupialization boasts a low recurrence rate [1] [2].

Marsupialization involves converting the cyst into a pouch [6] by creating a window in the cyst wall, connecting the inner epithelial lining with the oral mucosa to alleviate fluid pressure within the cyst and allow oral mucosa to grow into the cystic cavity. The resulting space is packed with gauze.

The objective of this report is to present a case of a dentigerous cyst involving an unerupted second mandibular molar and its surgical management in a pediatric patient. This voluminous mandibular cyst was treated by marsupialization, allowing the spontaneous eruption of the dental germ within 15 months, without any complications to the neighboring anatomical structures.

2. Case Presentation

An 11-year-old male patient was referred to the Oral Surgical Department of the

CHU IBNOU ROCHD Casablanca, Morocco, by his dentist after accidentally discovering an osteolytic lesion surrounding the impacted second mandibular right molar. The clinical examination revealed no specific findings, with the absence of lymphadenopathy.

The panoramic radiograph revealed a well-defined multilocular image with the presence of intralesional septa, surrounding the crown of tooth 47, located close to the basal border and superimposed with the distal root of tooth 46, and causing displacement of the germ of tooth 48 towards the ascending ramus. (Figure 1)

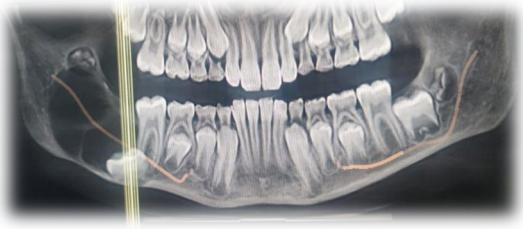

Figure 1. Preoperative orthopantomography showing a well-defined multilocular image. The lesion involves the right second molar, which has an open root apex, indicating it is still in an immature state.

A cone beam computed tomography (CBCT) was requested to accurately determine the extent of the lesion, which appeared well-defined with evidence of cortical thinning and expansion of the vestibular cortex. The aspiration was positive, yielding serohematic fluid, which guided us towards a cystic lesion. A provisional diagnosis of a dentigerous cyst was made. (Figure 2)

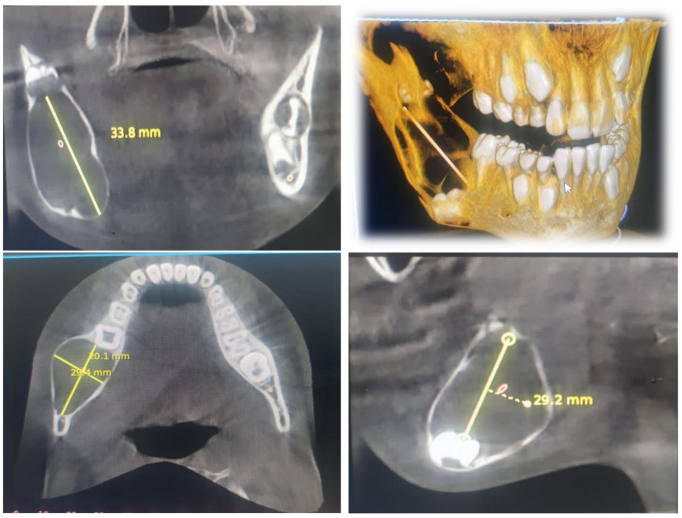

Figure 2. CBCT demonstrating the huge extension and thinning of the: buccal cortical expansion and thinning of the external and internal cortical tables

Considering the patient's age, the size and location of the cysts, as well as the absence of an identifiable mandibular canal, the marsupialization approach was chosen.

The primary objectives of the treatment were to clinically and radiographically eliminate the pathological entity through minimally invasive surgery, aiming to preserve the inferior alveolar nerve and dental germs, and promote bone regeneration.

The procedure was carried out under local anesthesia. A small incision was made to access the cystic cavity, and its contents were evacuated. At this point, a portion of the cyst was excised for histopathological examination. The cyst lining was then sutured to the oral mucosa using absorbable PLG (poly-DL-lactide/glycolide) sutures, creating a permanent opening for continuous drainage. To enhance drainage and maintain the opening, a drain was placed, utilizing sterile gauze soaked in a local antibiotic based on cycline as the drain **Aureomycine® 3 %**. The ribbon gauze pack was replaced every week following copious irrigation with saline and povidone-iodine. (Figure 3)

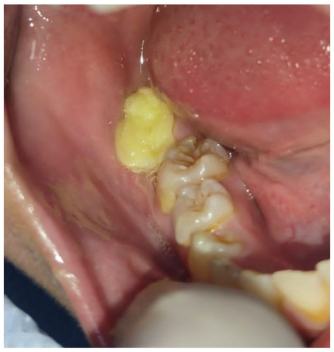

Figure 3. Endobuccal view showing replacement of ribbon gauze pack weekly following extensive irrigation with saline and povidone-iodine.

The patient is called back for a clinical control every eight, fifteen, and thirty days after the surgery. Control panoramic radiographies are done after three months, six months (Figure 4) and a year (Figure 5) (Figure 6).

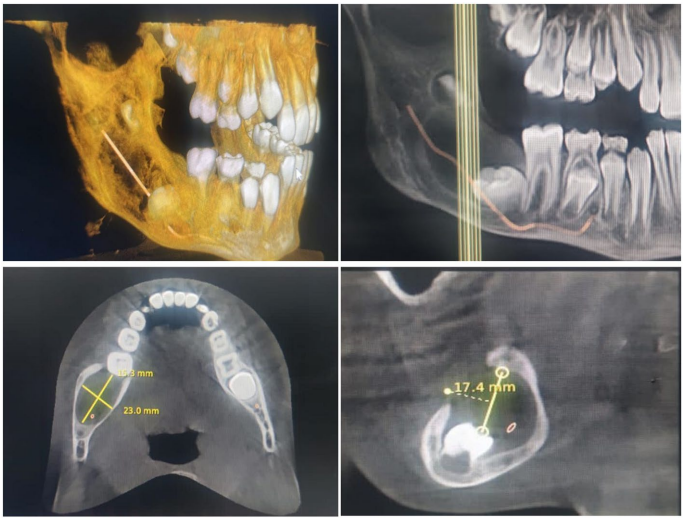

Figure 4. CBCT after 6 months of marsupialisation showing notable reduction in lesion volume.

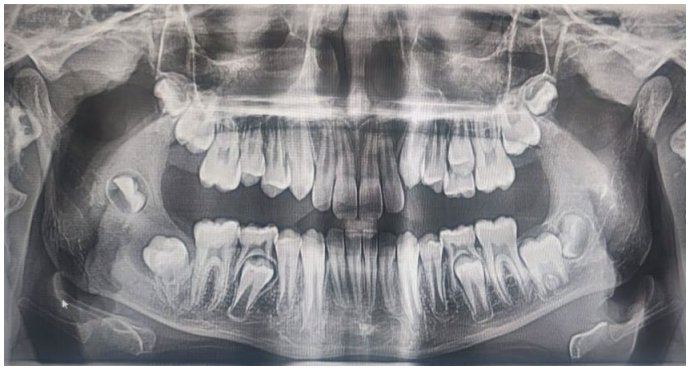

Figure 5. Panoramic radiograph after one year showing significant reduction in lesion volume and progress of the impacted tooth eruption.

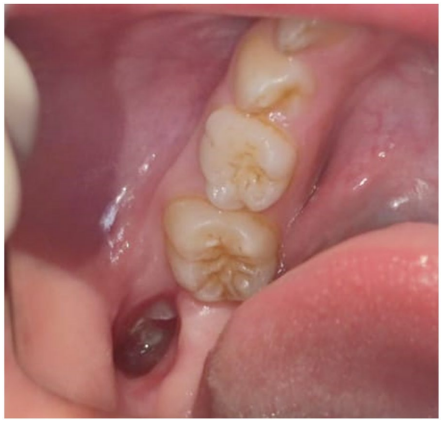

Figure 6. Endobuccal view showing the initial emergence of the impacted tooth crown after one year.

The clinical and radiographic evolution was without complication, the eruption of the germ of the tooth 47 took place 15 months after the date of the surgery. (**Figure 7**)

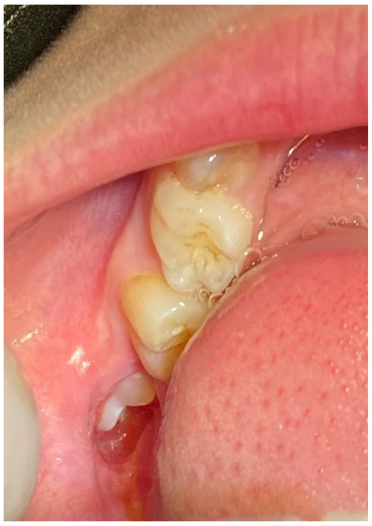

Figure 7. Follow up after 15 months

3. Discussion

Dentigerous cysts, also known as follicular cysts, are the second most common type of benign developmental odontogenic cysts. They arise from the accumulation of fluid between the reduced enamel epithelium and the crown of an unerupted tooth, causing bone destruction and posing a significant challenge for clinicians [7]. Dentigerous cysts are observed at all ages, with a higher frequency in men between the 2nd and 4th decades of life. They are most commonly found associated with the 3rd molar, the maxillary canine, and the second mandibular premolar [8]. In the present case report, the dentigerous cyst was associated with the right mandibular second molar in an 11-year-old male patient.

Dentigerous cysts are slow-growing odontogenic cysts that are often asymptomatic. As was the case with our patient.

As the cyst gradually enlarges, it can cause swelling of the external table. Significant facial deformity may occur only if the cyst becomes large and extends vestibularly. The overlying mucosa may appear normal, congested, or slightly bluish. As the lesion progresses, it may reach an externalization phase, where a depressible, fluctuating, and painless mass with a sharp, elastic, and thinned bony edge can be palpated [8].

Radiographically, dentigerous cysts are suspected when the follicular space exceeds 5 mm. They typically appear as well-defined radiolucent areas surrounding the crown of an impacted tooth [7]. The cyst can result in bone destruction, displacement of adjacent teeth, and root resorption. Additionally, it obstructs the eruption of the permanent teeth associated with the cyst [7]-[9]. However, our patient presented with a well-defined multilocular image associated with his immature right second mandibular molar.

The differential diagnosis for a dentigerous cyst should encompass primordial cyst, radicular cyst, simple bone cyst, aneurysmal bone cyst, ameloblastoma, ameloblastic fibroma, adenomatoid odontogenic tumor, myxoma, and keratocystic odontogenic tumor [9]. Histopathologically, the epithelium of a dentigerous cyst consists of 2 - 4 layers of smooth, nonkeratinized cells, with a smooth interface between the epithelium and the connective tissue. The epithelium may also contain mucous, ciliated columnar, and fat cells [7].

The literature indicates that the management of dentigerous cysts is exclusively surgical, with two primary treatment approaches: enucleation and marsupialization/decompression [10].

For non-extensive cysts, the initial treatment choice is usually total enucleation and curettage of the cyst, along with the extraction of the impacted tooth or teeth. Many authors have varying opinions regarding the enucleation of large dentigerous cysts. This variation is largely due to the fact that larger cystic cavities often lack proper organization of the blood clot, and the formation of new bone is uncertain. A blood clot in a devitalized area carries a high risk, as it can easily become infected and lead to complications such as local inflammation [2] [7].

Marsupialization and decompression are effective treatments for cysts associated

with mandibular premolars and maxillary canines. As demonstrated in the clinical case, marsupialization proved highly beneficial, enabling the preservation and eruption of the affected teeth.

Compared to other treatment options, decompression and marsupialization have the lowest risk of recurrence and minimal morbidity. They aid in the eruption of teeth retained by the cyst and allow for the preservation of functionally important teeth, with or without orthodontic traction. Although the predictive factors for the eruption of the tooth associated with the cyst are not well defined, the size of the cystic lesion does not influence the outcome. Favorable conditions include a younger age (<10 years), depth of inclusion, and germ angulation (<25˚). Spontaneous eruption of the tooth may not always occur following decompression or marsupialization, especially if there is inadequate space or an unfavorable eruption path. For those cases where no eruption occurs, a period of 100 days after marsupialization is suggested as a critical time for deciding whether to extract or use orthodontic traction [8]. In the present case, the tooth erupted only by marsupialization without orthodontic traction; all the above mentioned factors were favorable: no inclination of the tooth, incomplete root formation and enough space to allow eruption [9]. The length of the eruption is very variable, ranging from seven months to five years, and orthodontic traction can be associated [10].

Additionally, these methods reduce pressure within the cystic lesion, promote regression of the cyst, and support peripheral osseous healing by decreasing the expression of interleukin-1α and other inflammatory cytokines [8] [11].

Although marsuialization has advantages over enucleation, it also has notable drawbacks. The main issues are the ongoing presence of pathological tissue and the inability to perform a complete histopathological analysis of the lesion. Additionally, decompression involves a lengthy treatment process that necessitates regular dental follow-ups and daily local care. It requires strong cooperation from both the patient and their parents. In some situations, a second procedure may be needed if the tube is dislodged, the cyst does not fully regress, or the histological results do not match the suspected diagnosis [8] [12]. In this case, considering the cooperation of both the patient and her parents, marsupialization was advised. t allowed for the management of the cyst without complications and facilitated spontaneous eruption of the 47 after 15 months, without requiring orthodontic traction.

4. Conclusion

The approach to large dentigerous cysts remains controversial. Our experience with the marsupialization of extensive dentigerous cysts in this report suggests that surgeons may benefit from adopting a conservative approach. This method offers the significant advantage of promoting the spontaneous eruption of the impacted tooth without resorting to more aggressive treatment options.

Conflicts of Interest

The authors declare no conflicts of interest.

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