

Tooth Recovery after Enucleation of Large Dentigerous Cyst

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Case Report

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Abstract: Dentigerous cysts (DCs) are developmental cysts of odontogenic origin, which surround the crown of impacted or embedded teeth. The standard treatment for a DC is enucleation and extraction of the involved tooth. In large cysts, marsupialization is recommended to diminish the size of the osseous defect and to promote the eruption of the DC-associated teeth. However, cases reporting both of DC enucleation and preservation of the involved teeth are rare. This case report aimed to describe the management of an extensive DC in a 15-year-old Tunisian girl associated with the second right impacted premolar 15. The treatment instituted was cyst enucleation without extraction of the permanent teeth i.e we mixed both of the advantages of enucleation avoiding recurrence and marsupialization with preservation of the involved teeth. After one year of follow up, it positioned itself spontaneously without any orthodontic treatment.

Keywords: dentigerous cyst, permanent teeth, impacted teeth, enucleation

INTRODUCTION

A dentigerous cyst (DC), also called follicular cyst, is the second most common of the developmental odontogenic cysts of the jaws, after the radicular cyst accounting for 18.1% of all odontogenic cysts [1,2]. In pediatric populations aged 0–16 years, DCs account for approximately 30% of all odontogenic cysts [3]. It is often associated with a crown of an impacted teeth surrounded by an expansion of the follicle. The most frequently affected teeth are the third molars, maxillary canines, and premolars [4].

The DC develops in 2 ways: by accumulation of fluid between the tooth crown and the reduced enamel epithelium (REE) or between the layers of the REE [5]. It may result in destruction of bone, displacement of adjacent teeth and resorption of their roots and may prevent eruption of cyst-associated permanent teeth [6,7]. There are two principal methods for the treatment of DC: the first is its enucleation followed by tooth extraction to prevent a recurrence, the second is the marsupialization which offers an alternative conservative treatment being less invasive and also provides potential for the tooth to erupt into the oral cavity.

This report describes a new procedure that joins the enucleation of DC associated with an impacted right second premolar, and its preservation.

CASE REPORT

A 15-year-old Tunisian girl was referred to the Medicine and Oral Surgery Department in Monastir Dental Clinic for late maxillary teeth exfoliation. Her

medical history revealed no systemic diseases and the dental history showed a facial trauma that caused a coronal-radicular fracture of the 11, 12 and the 21. Intraoral clinical examination of the upper arch revealed the persistence, on the right, of the second deciduous molar 55 which was decayed and, on the left, just the deciduous canine 63. A hard swelling was localized in the right maxillary region on the palatal side (Figure 1).

Panoramic X-ray revealed the presence of a large translucent, uniloculated area with well-defined margins on the maxillary right side containing the impacted maxillary second premolar 15. On the left side, the maxillary canine was impacted 23 (Figure 2).

The patient was referred to CBCT examination of the maxilla to evaluate accurately the cyst extension in the three planes of space. The axial slide showed a unilocular well-demarcated cystic lesion that measured 21.7 mm*16.5mm (Figure 3/a), which has caused the palatal cortical bone to swell, this in turn, caused rupturing in some places. The height of this

cyst was measured in the sagittal slide; it was equal to 19.5 mm (Figure 3/b). Based on clinical and radiographic findings, a provisional diagnosis of DC was suggested at that time.

A comprehensive treatment plan was formulated, which included surgical enucleation of the dentigerous cyst without extraction of the involved permanent tooth. The patient was administered local anesthesia. Using a mucoperiosteal elevator, a full thickness palatal flap was raised from the maxillary left lateral incisor to the maxillary right first molar. The enucleation of the large cyst was completed and the cystic cavity was well scooped out followed by the temporary tooth extraction, whilst taking care to ensure proper curettage of the exposed dental wall (Figure 4).

Tissue from the exposed membranous wall was sent to the laboratory for histologic examination, which confirmed the diagnosis of DC. Hemostasis was achieved and the flap was placed back in position and sutured. Following surgery instructions were explained to the patient along with prescription of antibiotic and analgesic treatment. The recall visits were scheduled for the following week to remove sutures and evaluate the healing process. The patient was kept under observation until the successful eruption of the second permanent premolar. This followed one year of check-ups without any orthodontic treatment (Figure 5).

Another panoramic radiograph was requested to follow the eruption of the 15 (figure 6).



Fig-1: Swelling localized in the palatal right region of premolars, with the persistence of the 55 and absence of the 15.



Fig-2: Panoramic radiograph showing a cystic lesion associated with the impacted maxillary right second premolar 15. On the left, the maxillary left canine 23 was also impacted.

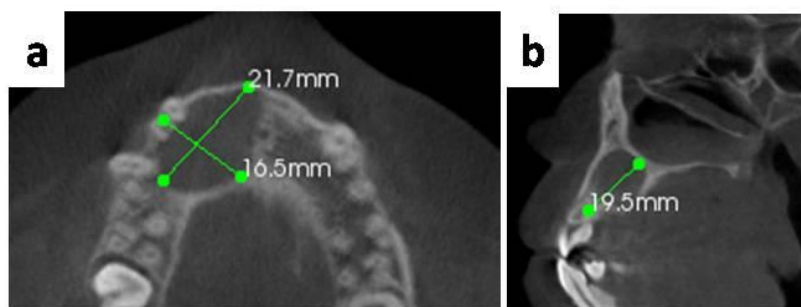


Fig-3: (a) The axial slide showed a cystic lesion that measured 21.7 mm*16.5mm. (b) The sagittal slide showed the height of the cystic lesion which is equal to 19.5 mm.



Fig-4: Enucleation of the extensive DC with extraction of the maxillary right deciduous first molar.



Fig-5: After one year we noted the successful eruption of the second right premolar (on the left, the canine is being erupted).



Fig 6: Panoramic radiograph showing the spontaneous positioning of the second right premolar without orthodontic traction after one year.

DISCUSSION

A dentigerous cyst is a developmental odontogenic cyst which originates through alterations of the reduced enamel epithelium in an unerupted tooth after the crown has been fully formed and attaches to it at the amelocemental junction.

It is the second most common of the developmental odontogenic cysts of the jaws, after the radicular cyst accounting for 18.1% of all odontogenic cysts [1,2]. In pediatric populations aged 0–16 years, DCs account for approximately 30% of all odontogenic cysts [3]. In fact, 95% of DCs involve the permanent dentition and most typical examples are those associated with the third molar teeth of the mandible,

followed by maxillary canines and premolars of both maxilla and mandible [8,9].

According to Brown's study which evaluated the frequency of the most common impacted permanent teeth and the frequency of DC site, it was reported that the maxillary second premolar could be impacted in 2.2% and could be associated to a DC in 3.8% [10].

This type of cyst occurs over a wide age range with a peak frequency in the second to fourth decades, occurring more frequently in males than females and in the white population rather than the black population [11]. The DC develops in 2 ways: by accumulation of fluid between the tooth crown and the reduced enamel

epithelium (REE) or between the layers of the REE [5]. It may result in destruction of bone, displacement of adjacent teeth and resorption of their roots and may prevent eruption of cyst-associated permanent teeth [6,7].

However, it has also been reported that inflammation progressing from the root apex of the deciduous tooth brings about development of the dentigerous cyst around the unerupted permanent tooth [12]. In fact, the perception of dentigerous cyst of inflammatory origin was first given by Bloch-Jorgensen [13], who suggested that the origin of all follicular cysts in his series was from the overlying necrotic deciduous tooth. The resultant periapical inflammation had spread to involve the follicle of the unerupted permanent successor; inflammatory exudates ensued with resultant dentigerous cyst formation. This hypothesis might be applicable in our clinical case report because the second deciduous molar was decayed and associated with DC involving the impacted second premolar.

Radiographically, DC appears as well-circumscribed, demarcated, and unilocular with a sclerotic border. We should be careful of dilated or hyperplastic follicles which are also frequently taken to be DCs. As a rule, if the follicular space is >4 mm it is more likely to represent a cyst than an enlarged follicle [14].

From a clinical standpoint, the differential diagnosis of a DC should include other odontogenic cystic lesions such as radicular cysts, odontogenic keratocysts, and odontogenic tumors as ameloblastoma, Pindborg tumor, odontoma, odontogenic fibroma, and cementomas [15-18]. A differential diagnosis with the adenomatoid odontogenic tumor is necessary because early lesions do not exhibit calcifications [19].

Histologically, the DC consists of a fibrous wall lined by non keratinized, stratified, squamous epithelium, presenting myxoid tissue, odontogenic remnants and, rarely, sebaceous cells [20]. The preoperative examination included, intraoral and panoramic, but they are still insufficient for evaluating both of the exact position of the impacted tooth and the DC extension. In this present case, CBCT provided valuable information which was helpful because it determined the morphology and the 3D localization of the impacted second premolar. It also specified its relationship with the adjacent anatomical structures which is important for the treatment decision. In fact, the DC measured about 21.7*16.5*19.5 mm³ (figure 3), it was extensive but it swelled the palatal cortical bone with its rupture in some places. Moreover, it was distanced from the maxillary sinus and the nasal cavity, detected from CBCT images.

Generally, if the operation itself does not cause postoperative morbidity, DCs should be enucleated with tooth extraction [21,22]. Large DCs should be marsupialized if enucleation and tooth removal might result in the destruction of the nerve and blood supply to adjacent teeth. As the teeth involve adjacent anatomic structures, such as the maxillary sinus, the nasal cavity, or the orbital cavity, involve major neurovascular bundles, such as the inferior alveolar one, or possibly result in the fracture of the mandible. Almost all, dentigerous cysts, large or small, that contain the crowns of teeth which can serve a useful purpose should be marsupialized, and with orthodontic aid the teeth should be moved into the dental arch in pediatric dentistry [23,24]. In our case report, we have individualized the case by choosing a treatment plan that was not described in the literature. Therefore, we opted for a DC enucleation without extraction of the impacted second premolar.

On one hand, we tried to make a logic decision that combined the advantages of both of enucleation and marsupialization. It means we opted for enucleation of this extensive DC to avoid recurrence and we recovered the impacted involved tooth which is the main advantage of the marsupialization. On the other hand, we avoided the disadvantages of the two procedures; in fact, the major disadvantage of the marsupialization is the pathologic tissue left in place. Even if a tissue sample is sent to the laboratory for histological examination, the existence of a more aggressive lesion in the residual tissue was possible, this is the main reason why we opted for enucleation.

Moreover, according to this case report the bone destruction caused by the DC was deported on the palatal side without risk of damaging adjacent anatomical structures such as the maxillary sinus or the nasal cavity, so in order to avoid recurrence, we chose a radical treatment, enucleation, in place of marsupialization.

Finally, the orthodontic treatment was not needed here, because the impacted second premolar was near to its future eruption site with a good axis. In addition, the fact of getting the deciduous tooth removed, has reactivated the eruption potential of the second premolar which is positioning itself spontaneously after one year of follow up.

CONCLUSION

This paper discusses the successful recovery of a tooth from a large dentigerous cyst associated with the maxillary impacted second premolar treated by enucleation. The individualization of this treatment plan results from a confrontation between a rigorous clinical examination and a detailed radiological analysis.

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