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Different approaches for management of dentigerous cyst - A case series

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## Abstract

Dentigerous cysts are benign odontogenic cysts associated with crowns of Unerupted and/or impacted permanent teeth. They frequently occur during the second and third decades of life. Treatment modalities range from enucleation to marsupialization, which may be influenced by the age of the patient, severity of impaction, and root form of associated tooth/teeth. The purpose of this report is to describe the successful outcome of three surgi cal management procedures of a large dentigerous cyst associated with an impacted mandibular second premolar including enucleation of the cyst with the retention of the premolar, enucleation followed by graft placement and enucleation followed by decompression of cyst in young patients.

**Keywords**: Dentigerous cyst, impacted premolar, mixed dentition, odontogenic cyst

### Introduction

Dentigerous cyst or follicular cyst is an odontogenic cyst associated with the crown of an impacted, embedded, unerupted or developing tooth.<sup>[1]</sup> It surrounds the crown of an unerupted tooth and is attached at the cementenamel junction. It is the second most common type of odontogenic cysts accounting for 14% to 24% of all jaw cysts. <sup>[2,3]</sup> These cysts occur more frequently during second and third decades of life, however, they can also be found in children and adolescents in the mixed dentition stage.<sup>[2-4]</sup> Dentigerous cyst has a slightly more male predilection than females.<sup>[2,5]</sup> Most commonly seen in relation to mandibular third molars, followed by maxillary canines and maxillary third molars. Maxillary and mandibular premolars have also been associated with dentigerous cysts.<sup>[2-8]</sup> Dentigerous cysts have also been reported in association with impacted deciduous teeth. <sup>[9,10]</sup>

Dentigerous cysts are generally asymptomatic until the swelling becomes noticeable. Infection of a dentigerous cyst causes the usual symptoms of pain and accelerated swelling. These are often an incidental finding during a routine radiographic examination and are characterized by a symmetric, well circumscribed, rounded, unilocular radiolucent lesion and contains the crown of a tooth displaced from its normal position. Dentigerous cysts are generally treated by surgical means. The surgical modalities include total enucleation <sup>[3]</sup>, marsupialization <sup>[5,6]</sup> and decompression of the cyst via fenestration.<sup>[6]</sup>

This paper describes the management of dentigerous cyst in three different ways i.e., enucleation of the cyst with retention of the premolar, enucleation followed by graft placement and enucleation followed by decompression of cyst in young patients.

#### **Case report 1**

A 10-year-old male patient reported with a chief complaint of pain and swelling in the left mandibular vestibule since seven months. On extra oral examination, a diffused hard swelling measuring about 3x 3cm was extending from the corner of the mouth to the angle of the mandible with localized raised temperature. Left submandibular lymph node was firm and tender on palpable. Intra oral examination revealed a soft, brownish red, round swelling of about 1x1cm extending from 74 to 36.

A panoramic radiograph (Fig. 1.1) showed a welldefined circumscribed radiolucency extending from 74 to 36 involving 34,35, and 36. The margins of the lesion were in close proximity to the distal aspect of 34 and the mesial root of 36. Radiolucency involving enamel, dentin and pulp chamber was seen with respect to 75. Root resorption of the 74 and 75 was evident. The CBVT images (Fig. 1.2) revealed that the root of the impacted tooth (35) was intimately associated with the inferior alveolar canal. This information, which was not revealed on the OPG, enabled to employ the necessary intrasurgical care to prevent any trauma to the nerve. The histopathologic examination of the aspiration biopsy

revealed a cystic lesion, and diagnosed as dentigerous cyst.

Surgical enucleation was considered as the treatment of choice. Involved primary teeth, 74 and 75 were extracted under local anesthesia before the disclosing of the cyst cavity by opening a flap. After the flap opening process, deroofing of the cyst and excision of the lesion was carried out. The second premolar was retained into the crypt. (Fig. 1.2) The flap was then sutured for closing the wound primarily [Fig. 1.2]. A lingual arch space maintainer was given to hold the space for permanent teeth.

The specimen was prepared sent for and histopathological examination. Histo pathological view showing non keratinizing stratified squamous epithelium, edematous connective tissue consisting of inflammatory cells and tissue disintegration or necrosis at areas confirmed the diagnosis of infected dentigerous cyst without evidence of any dysplastic changes.

The patient was on regular follow up for six months. No complications were developed following enucleation and the eruption of premolars was clinically and radio graphically appreciated.

#### Case report 2

An 8-year-old female reported with the chief complaint of swelling on the right side of her lower jaw.

The swelling had been growing slowly over the period without any pain or discharge. The overall general physical health of the patient was good with nonspecific general medical history, without any contraindication to dental treatment. Intraoral examination revealed a mixed dentition and a hard, non-tender, non-fluctuant swelling

of  $1.5 \times 1.5$  cm in the mandibular right vestibule, extending from the distal to the primary right canine to the mesial surface of ipsilateral first permanent molar. The swelling was associated with expansion of buccal and lingual cortical plates and covered by healthyappearing and freely-moving mucosa. A panoramic radiographic examination (Figure 2.1) revealed the presence of all the permanent teeth without any supernumerary teeth. Subsequently, CBVT was also made (Figure 2.2). There was a well-circumscribed unilocular radiolucent lesion in the body of the mandible on the right side, which was associated with the crown of a vertically impacted second premolar. The root of the impacted second premolar was not developed. The cystic structure appeared to have originated from the second premolar with inferior and distal displacement of the same tooth. The corresponding deciduous tooth 85 was still present which was previously pulpectomized.

The histopathologic examination of the aspiration biopsy revealed a cystic lesion, and diagnosed as dentigerous cyst.

Surgical enucleation of the cyst and placement of a bone graft was planned in the present case. Thus, extraction of 84 and 85 was done under local anesthesia. Cystic sac along with the involved second premolar was removed (Fig.2.3). An alloplastic bone graft was placed into the defect followed by suturing. Acrylic template was given.

#### **Case report 3**

An 11-year-old female reported with the chief complaint of a painless swelling on the right side of her lower jaw since three months. On general physical examination, the patient was apparently healthy without any significant past medical history and routine hematological tests were within the normal limits.

Extraoral examination revealed a diffuse swelling over the lower margin of the right mandible. Intraoral examination revealed a hard, non-tender, non-fluctuant swelling of  $2.5 \times 2$  cm in the mandibular right vestibule, extending from the distal surface of the right permanent lateral incisor to the distal surface of ipsilateral first permanent molar. The swelling was associated with expansion of buccal cortical plate and covered by healthy-appearing and freely-moving mucosa. Α panoramic radiographic examination (Figure 3.1) revealed the presence of all the permanent teeth without any supernumerary teeth. Subsequently, an occlusal radiograph (Figure 3.2) and CBVT (Figure 3.3) were also made. There was a well-circumscribed unilocular radiolucent lesion in the body of the mandible on the right side and extended to the lower border of the mandible. which was associated with the crown of a vertically impacted second premolar. The root of the impacted second premolar was developed approximately up to less than one fourth of its usual length. The cystic structure appeared to have originated from the second bicuspid with inferior and mesial displacement of the same tooth. The corresponding deciduous tooth, 85 was still present with carious crown and roots.

The histopathologic examination of the aspiration biopsy revealed a cystic lesion and diagnosed as dentigerous cyst.

In the present case, extraction of 85 and 46 was done under local anesthesia and surgical pack was given. Here socket was used to establish a communication between the cyst cavity and the oral cavity (Figure. 3.4).

#### Discussion

The association between an infected primary tooth and the development of a dentigerous cyst involving the preerupted permanent tooth has been discussed through the ages.

The key to the formation of a dentigerous cyst appears to be the accumulation of fluid either between the reduced

enamel epithelium and the enamel or between the layers of the enamel organ. This may be a result of pressure exerted by a potentially erupting tooth on the follicle which obstructs the venous outflow and induces serum transduction across the capillary wall.<sup>[4]</sup>

Murakami et al, suggest that an intrafollicular spread of periapical inflammation from a primary tooth also may result in the development of a dentigerous cyst.<sup>[3]</sup> These cysts can be referred to as inflammatory dentigerous cysts.

The aim of the treatment for such dentigerous cysts is complete elimination of pathology and maintenance of dentition with minimal surgical intervention. And the type of surgical treatment is influenced by the nature of the causative factors. If the cyst is associated with supernumerary or wisdom tooth, complete enucleation of the cyst along with extraction of tooth may be the treatment of choice. However, when preservation of the teeth is desirable, tooth is in a favorable position and space is available, also in case of a young patient where the lesion is isolated, it may occasionally be possible to marsupialize the dentigerous cyst to allow the tooth to erupt.<sup>[7]</sup>

Treatment of dentigerous cyst depends on size, location, and disfigurement and may require bone removal to ensure total excision of the cyst, especially in cases of large ones. This may even require Weber- Ferguson incision as stated by Shah NJ. Now a days, Scott-Brown has stated that marsupialization of the cyst lining is the treatment of choice for dentigerous cyst in children in order to give a chance to the unerupted tooth to erupt.

Many authors have emphasized the importance of maintaining the opening between the cyst and the oral cavity artificially not only to heal the cystic lesion but also to prevent the formation of a fibrous scar which can impair eruption of the involved teeth. [<sup>1,5,6,8,11]</sup> However,

Mohapatra P. and Joshi N. reported a case supporting the hypothesis that simple decompression of the cyst and further root development would allow for the spontaneous relocation of the associated tooth.<sup>[1]</sup>

Present case report describes three cases treated by three different approaches considering their anatomic site, clinical extent, size, age, and follow-up possibility. All the three patients were in their first decade with mixed dentition. Dentigerous cysts were found with in relation to mandibular second premolars involving corresponding predessors. In these cases, enucleation of cyst wall along with removal of primary teeth was done. Guidance to permanent teeth to erupt was planned considering the young age, incomplete root formation, availability of space.<sup>[13-15]</sup>

In the first case, extraction of primary first and second molars was carried out followed by the excision of cystic lining. And the second premolar was retained into the crypt, considering the greater capacity of bone regeneration among children than adults and greater eruption potential of teeth with open apices. <sup>[14,15]</sup> Regular follow up of the patient for about six months showed the eruption of second premolar clinically and radiographically without any noted complications, thus preserving the function and esthetic values.

In the second case, surgical enucleation of the cyst and placement of a bone graft was done. Cystic sac enclosing the second premolar firmly at the cervical margin was removed and an alloplastic bone graft was packed into the defect.

In the third case, considering the large size of the cyst approaching the border of mandible, thinning of bone and inferior position of involved tooth, extraction of involved primary and permanent teeth was done followed by decompression of the cyst through the

extraction socket to avoid any risk of mandibular fracture and trauma to underlying nerve.

All the three cases were under regular follow up for the assessment of progress of resolution. No complications or recurrence were observed following the treatment.

#### Conclusion

This case report illustrates the various conservative surgical treatment modalities for dentigerous cyst in adolescents in the mixed dentition stage. Spontaneous bone regeneration, greater healing capacity and eruption potential in young patients make treatment of dentigerous cysts in children distinct entities from those in adults, with a much better prognosis for the teeth involved. Thus, appropriate conservative surgical treatment modalities for dentigerous cyst in adolescents in the mixed dentition stage can result in elimination of the pathology and maintenance of dentition with minimal surgical interventions.

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## Legend Figures

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Figure 1:



Figure 2:



Figure 3:



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Figure 4:



Figure 5:



Figure 6:



Figure 7:

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Figure 8:



Figure 9:



Figure 10:



Figure 11:



Figure 12: