



Research Paper

## Marsupialization: a better treatment modality in the management of dentigerous cysts associated with erupting young permanent tooth- Case series and Literature review.

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### Abstract

Dentigerous cysts are one of the most common developmental types of odontogenic cysts that develop in the oral cavity. They frequently appear as incidental observations on dental radiographs and/or as asymptomatic swellings. These cysts develop from remnants of decreased enamel epithelium adhering at the cemento-enamel junction surrounding the crown of an unerupted or impacted tooth. The majority are considered developmental. However, in young patients, they may be inflammatory in origin, the result of caries in the primary dentition. The treatment modalities range from marsupialization to enucleation of the lesion and are based on the involvement of the lesion with the adjacent structures. However, the loss of a permanent tooth in the management of a dentigerous cyst can be devastating to a child. The present case series highlights the extraction of primary teeth involved in the lesion and marsupialization followed by the placement of a surgical obturator to maintain patient opening for drainage of cystic contents.

**Keywords:** marsupialization, surgical obturator, enucleation unerupted tooth, cyst, young child, mixed dentition, Dentigerous cyst.

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## I. Introduction

Dentigerous cysts are the most common of all developmental odontogenic cysts of the jaws and account for approximately 20–24% of jaw cysts. They develop around the crown of an unerupted tooth by the expansion of the follicle when fluid collects or space is created between the reduced enamel epithelium and the enamel of an impacted tooth<sup>1</sup>. The crown of an unerupted or impacted tooth is always included in a dentigerous cyst, which is most typically found in the mandibular third molar area.<sup>2,3</sup> followed, in order of frequency, by the maxillary canines, maxillary 3rd molars, and, rarely, the maxillary central incisors<sup>4</sup>. The cyst may cause swelling, tooth displacement, tooth mobility, and sensitivity if it reaches a size larger than 2 cm in diameter<sup>5</sup>. Dentigerous cysts on radiographs typically have a well-defined unilocular radiolucency, often with a sclerotic border, surrounding the crown of an unerupted tooth<sup>4</sup>. Histologically, the cyst has a fibrous wall bordered by non-keratinized stratified squamous epithelium comprising myxoid tissue, odontogenic remnants, and, in rare cases, sebaceous cells.<sup>6</sup> If untreated, these cysts may cause pathologic bone fracture, impaction of the permanent tooth, bone deformation, ameloblastoma, and the development of squamous cell carcinoma or mucoepidermoid carcinoma<sup>7</sup>. The treatment modality indicated for such a cyst is either surgical removal of the cyst (enucleation), avoiding damage to the involved permanent tooth, or enucleation of the cyst along with the removal of the involved tooth, or the use of a marsupialization technique<sup>8</sup>. These cases presented here describe the management of dentigerous cysts in children using the marsupialization technique.

### Case series

#### Case -1

An 11-year-old male patient reported to the Department of Pedodontics and Preventive dentistry with the chief complaint of swelling in the lower right back tooth region for 5 months. In the history of the present illness, the patient gives the history of swelling which is gradually progressive and attained the present size leading to facial asymmetry the swelling was associated with carious tooth and intermittent pain for 5 months and the pain subsided after taking analgesics. On general examination, the patient was healthy and had no other bony lesion or defect in the body. There was no apparent history of past illness, hospitalization, or trauma to the jaw.

On extraoral examination, facial asymmetry was noted on the right lower side of the face, with no sinus or active discharge of pus. The submandibular lymph nodes on the right side of the mandible were enlarged, palpable, tender, and mobile, which suggested chronic infection from the tooth (figure-1). On intraoral examination, hard swelling in 84, and 85 regions were found with obliteration of the buccal vestibule. The swelling was bony hard with the expansion of the buccal cortex in 84, and 85 regions with no expansion of the lingual cortex (figure-2).

In the radiograph [orthopantomography (OPG)], an oval-shaped, unilocular radiolucency was noticed around the developing 1<sup>st</sup> and 2<sup>nd</sup> premolars with a radiopaque border. The deciduous 1st molar and 2<sup>nd</sup> molar were grossly decayed with loss of bone in the bifurcation area and completely resorbed roots. (Figure-3)

The contents of the swelling were aspirated and sent for investigations which revealed thick blood mixed with mucoid material. The cytopathologic examination of the aspirate showed mucoid material, RBC, clumps of benign epithelial cells, and plenty of cyst macrophages. A provisional diagnosis of an inflammatory type of dentigerous cyst was made on the basis of the above findings.

Since both the mandibular premolars were involved in the cystic lesion it was decided to do marsupialization of the cystic lesion followed by placement of a post-surgical obturator. Both the primary molars (84,85) were extracted and marsupialization of the lesion was planned through the extracted socket to create a window allowing continuous drainage of the cystic content. The extracted site was irrigated with betadine solution followed by the placement of a surgical obturator.

Follow-up examination revealed, after 15 days, there was a slight occlusal movement of the developing tooth bud, but there was no apparent reduction in the radiolucency. (Figure-4)

After 3 months, there was the further occlusal movement of the developing tooth and there was a huge reduction in the radiolucency. The root formation of the mandibular right 1<sup>st</sup> and 2<sup>nd</sup> premolars had started, and the bone formation was evident in the cystic cavity. (Figure -5)

After 6 months, mandibular right 1<sup>st</sup> and 2<sup>nd</sup> premolars had successfully erupted into the oral cavity with two-thirds root formation. (Figure-6)

**CASE:-1**



Figure :-1 Extra oral view



Figure :-2 intra oral marsupialization and surgical obturator placement



Figure :-3 (preoperative OPG)



Figure :-4 (post- operative OPG after 15 days)



Figure :-5 (post- operative OPG after 3 months)

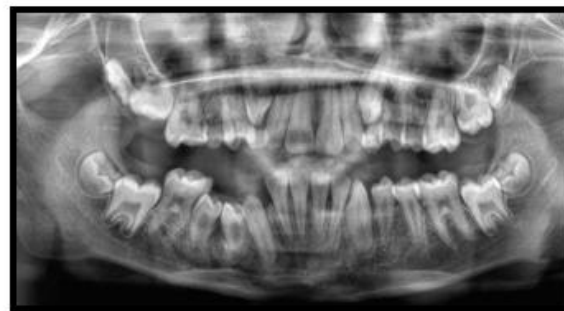


Figure :-6 (post- operative OPG after 6 months)

**Case :2**

An 8-year-old female patient reported to the Department of Pedodontics and Preventive dentistry with the chief complaint of swelling in the lower right back tooth region for 2 months. In the history of the present illness, the patient gives the history of swelling which is gradually progressive and attained the present size leading to facial asymmetry the swelling was associated with carious tooth and intermittent pain for 2 months and the pain subsided after taking analgesics. Patient underwent an extraction of tooth associated with swelling one week before reporting to the hospital at the local clinic. On general examination, the patient was healthy and had no other bony lesion or defect in the body. There was no apparent history of past illness, hospitalization, or trauma to the jaw.

On extraoral examination, facial asymmetry was noted on the right lower side of the face, with no sinus or active discharge of pus. The submandibular lymph nodes on the right side of the mandible were enlarged, palpable, tender, and mobile, which suggested chronic infection from the tooth. (Figure-7)

On intraoral examination solitary swelling is seen on the right side of lower vestibule which is roughly oval in shape and measuring approximately 2X2 cm in size and extending antero-posteriorly from 84 to 85. Unhealed extraction socket in 85 is seen intra orally. (Figure-8)

In the radiograph [orthopantomography (OPG)], an oval-shaped, unilocular radiolucency was noticed around the developing 2<sup>nd</sup> premolars with a radiopaque border and the mesio-buccal root of mandibular first molar is also involved in the cystic lesion. (Figure-9)

The contents of the swelling were aspirated and sent for investigations which revealed thick blood mixed with mucoid material. The cytopathologic examination of the aspirate showed mucoid material, RBC, clumps of benign epithelial cells, and plenty of cyst macrophages. A provisional diagnosis of an inflammatory type of dentigerous cyst was made on the basis of the above findings.

Since the mandibular premolar was involved in the cystic lesion and due to the large cystic size, it was decided to do marsupialization of the cystic lesion followed by placement of a post-surgical obturator. Marsupialization of the lesion was planned through the extracted socket to create a window allowing continuous drainage of the cystic content. The extracted site was irrigated with betadine solution followed by the placement of a surgical obturator.

Follow-up examination revealed, after 1 month, there was a slight occlusal movement of the developing tooth bud, but there was no apparent reduction in the radiolucency. (Figure-10)

After 3 months, there was the further occlusal movement of the developing tooth and there was a huge reduction in the radiolucency. The root formation of the mandibular right 1<sup>st</sup> premolar had started, and the bone formation was evident in the cystic cavity. (Figure-11)

After 9 months, the mandibular right 1<sup>st</sup> premolar had successfully aligned for eruption into the oral cavity with two-thirds root formation. (Figure-12)

## CASE:- 2



Figure :-7 Extra oral view



Figure :-8 (intra oral marsupialization and surgical obturator placement)



Figure :-9 (preoperative OPG)



Figure :-10 (post- operative OPG after 3 months)



Figure :-11 (post- operative OPG after 6 months)

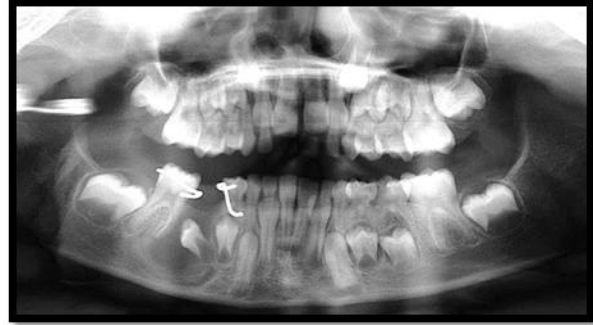


Figure :-12 (post- operative OPG after 9 months)

**Case:3**

A 08-year-old male patient reported to the Department of Pedodontics and Preventive dentistry with the chief complaint of swelling in the lower right back tooth region for 2 months. In the history of the present illness, the patient gives the history of swelling which is gradually progressive and attained the present size leading to facial asymmetry the swelling was associated with intermittent pain for 2 months and the pain subsided after taking analgesics. On general examination, the patient was healthy no other symptoms were reported by the patient.

On extraoral examination, facial asymmetry was noted on the left side above the upper lip, with no sinus or active discharge of pus.(Figure-13).On intraoral examination, all inspection findings confirmed solitary swelling is seen on the left side which is hard in consistency and obliterated upper vestibule space is seen. Swelling is roughly oval in shape and measuring approximately 2X2 cm in size and extending antero-posteriorly from 61 to 62.(Figure-14)

The contents of the swelling were aspirated and sent for investigations which revealed thick blood mixed with mucoid material. The cytopathologic examination of the aspirate showed mucoid material, RBC, clumps of benign epithelial cells, and plenty of cyst macrophages. A provisional diagnosis of an inflammatory type of dentigerous cyst was made on the basis of the above findings.

Since the maxillary canine was involved in the cystic lesion and due to the large cystic size, it was decided to do marsupialization of the cystic lesion followed by placement of a post-surgical obturator. marsupialization of the lesion was planned through the extracted socket of 61,62 to create a window allowing continuous drainage of the cystic content. The extracted site was irrigated with betadine solution followed by the placement of a surgical obturator.

Follow-up examination revealed, after 3 month, there was a slight occlusal movement of the developing tooth bud, but there was no apparent reduction in the radiolucency.(Figure-15)

After 6 months, there was the further occlusal movement of the developing tooth and there was a huge reduction in the radiolucency. The root formation of the maxillary canine had started, and the bone formation was evident in the cystic cavity.(Figure-16)

**CASE :-3**



Figure :-13 Extra oral view



Figure:- 14 (intra oral marsupialization and surgical obturator placement)

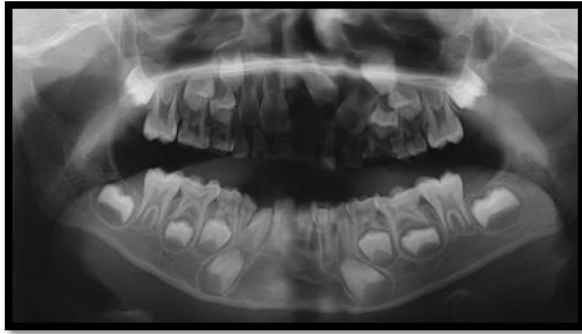


Figure :-15 (preoperative OPG)



Figure :-16 (post-operative OPG after 3 months)

## II. Discussion

The literature describes two forms of dentigerous cysts: developing and inflammatory. The developing kind of dentigerous cyst is said to occur around the crown of an unerupted tooth due to fluid buildup either between the decreased enamel epithelium and the enamel or between the layers of the enamel organ. This fluid collection develops as a result of pressure applied by an erupting tooth on an impacted follicle, which obstructs venous outflow and so produces fast serum transudation across the capillary wall.<sup>9</sup> According to the other hypothesis of the origin of developmental type dentigerous cyst, the most likely origin of the dentigerous cyst is the disintegration of proliferating cells of the follicle following the delayed eruption.<sup>10</sup> These breakdown products cause increased osmotic tension and, as a result, cyst development. Bloch proposed that the inflammatory kind of dentigerous cyst is thought caused by overlying nonvital necrotic deciduous tooth. The resulting periapical inflammation expands to encompass the follicle of the unerupted permanent successor, resulting in the creation of a dentigerous cyst.<sup>11</sup>

Dentigerous cysts most commonly occur in the ages of twenties or thirties<sup>12</sup>. However, the frequency in children is relatively low, and 4–9% of these cysts occur in the first 10 years after birth<sup>13</sup>. A study involving a histological evaluation of cysts occurring in the mixed dentition stage detected an inflammatory process caused by a primary tooth in 93.6% of the observed follicular cysts<sup>14</sup>.

In this present investigation, the first and third cases are an inflammatory type of dentigerous cyst originating from the nonvital primary mandibular 1st molar. The second case is a developmental type of dentigerous cyst in the maxilla associated with a permanent canine below a vital primary canine.

In the differential diagnosis, a large periapical cyst, odontogenic keratocyst, central giant-cell granuloma, and unicystic ameloblastoma can mimic a dentigerous cyst. A radiograph cannot distinguish between the various types of lesions discussed above that are connected with the root of a nonvital or vital primary tooth affecting the crown of a growing permanent tooth<sup>11</sup>. Therefore, FNAC and histopathologic investigation of the cyst contents and lining are required for a definitive diagnosis. Furthermore, the epithelial cells lining the dentigerous cyst lumen have an exceptional potential to undergo metaplastic transformation. Untreated dentigerous cysts may occasionally evolve into an odontogenic tumour (e.g., ameloblastoma) or a malignancy (e.g., oral squamous cell carcinoma)<sup>15</sup>. To avoid such complications, marsupialization and surgical enucleation of the cyst lining may be the treatment of choice for such a cyst.

Based on the above, removing the source of inflammation, that is, the primary mandibular right first molar in our patient is the essential therapeutic procedure.

Marsupialization, decompression, and the Partsch procedure all refer to making a surgical window in the cyst wall, emptying the contents of the cyst, and keeping the cyst connected to the oral cavity, maxillary sinus, or nasal cavity. It is a method of attempting to reduce intracystic pressure by creating an additional cavity. This approach was chosen because it is a more conservative strategy for the treatment of larger cysts, particularly in pediatric dentistry where these lesions are frequently close to growing permanent tooth buds.

To reduce intraluminal pressure and promote bone development, the cyst must be kept open. This is accomplished by the use of different devices, such as simple iodoform gauze, stents, brackets, and chains connected to impacted teeth, or detachable partial dentures that function as obturators.<sup>17,18</sup> In our cases, we have made a post-surgical obturator made of acrylic, it is retained intraorally using clasps. It consists of a vertical extension of acrylic from the base of the acrylic plate which enters and coincides with the marsupialization trough created intraorally. The vertical extension helps in maintaining the cystic opening patent. (figure-). The vertical extension is adjusted according to the clinical condition and eruption status of the permanent tooth during the check-up appointments. We did not observe commonly reported problems like infection or obliteration of its entrance<sup>18</sup>.

Full eruption of the affected permanent teeth and healing of the cystic cavity happened in our patient after 12 months, which is slightly longer than Allon et al reported, where the estimated mean decompression duration in children under the age of 18 is 7.5 months.<sup>19</sup>

Previous case reports, as well as ours, show that permanent successors erupt into the dental arch even when badly dislocated.<sup>20</sup> According to a comprehensive study conducted by Nahajowski et al, a patient's young age (10 years) and root formation less than half its entire length appear to be characteristics that raise the likelihood of a spontaneous eruption.<sup>21</sup> Very few studies have reported the use of surgical obturators in the management of dentigerous cysts in young patients which favors the eruption of permanent teeth. Further research is needed to assess the effect and outcome of the surgical obturators.

### III. Conclusion

Dentigerous cysts can be effectively treated with minimum intervention, such as decompression and marsupialization. Essential structures can be conserved and spontaneous eruption of permanent teeth obtained by eliminating diseased primary teeth and guaranteeing continuous drainage with a device like ours, decreasing the need for prosthetic rehabilitation. Regular check-ups should be planned for the patient until the healing process is complete.

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