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Case Study

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CARNOY'S: A COMPLIMENTARY MINISTRATION AFTER CONSERVATIVE EXCISION

Dr. Niharika Sharma[1*], Dr. Chaitra T. R.[2], Dr. Deveshi Nigam[3] and Dr. Sagnik Dipta Panja[4]

[1,3,4]Post Graduate Student, Department of Pedodontics and Preventive Dentistry, Kothiwal Dental College and Research Centre, Moradabad, Uttar Pradesh, India.

[2]Professor, Department of Pedodontics and Preventive Dentistry, Kothiwal Dental College and Research Centre, Moradabad, Uttar Pradesh, India.

***Corresponding Author: Dr. Niharika Sharma**
Post Graduate Student, Department of Pedodontics and Preventive Dentistry, Kothiwal Dental College and Research Centre, Moradabad, Uttar Pradesh, India.

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ABSTRACT

Jaw cysts present as swelling of jaws and midface. The most common cyst of jaw is the dentigerous cyst which is a common noninflammatory odontogenic cyst and associated with an impacted tooth. They are discovered incidentally on radiographic examinations and cause bony expansion and asymptomatic facial swelling. The case report presents the surgical management of inflammatory dentigerous cyst in a 6-year-old female patient on left mandibular premolar region with radiographic feature of large unilocular radiolucency involving unerupted second premolar.

KEYWORDS: Dentigerous cyst, Enucleation, Obturator, Radicular cyst.

Clinical relevance to interdisciplinary dentistry

- Early diagnosis by the means of radiographic and histopathological basis provides a path for the reduction of the future deleterious effects.
- Dentigerous cyst even if small and not causing any severe symptoms, must be removed in toto to avoid complications.

INTRODUCTION

Spectrum of jaws inculcates the children as the victims who however are prone to develop the developmental lesions, odontogenic in origin. Dentigerous cyst are the prevalent odontogenic cyst associated with an unerupted or developing tooth which is epithelial -lined developmental cavity which develops from the epithelial remnants of tooth forming cells which encloses the crown of the unerupted tooth at cementoenamel junction and cause gross destruction and osseous deformities due to proliferation.[1] The incidence of dentigerous cyst has been reported as 1.44 in every 100 unerupted teeth. Most commonly involves the mandibular tooth specially the mandibular third molar. It may extend to the ramus and may cause displacement of adjacent tooth.[2] Marsupialization is the preferred treatment for the dentigerous cyst which however contemplate the smooth and uneventful eruption of the underlying teeth. Enucleation of the cyst is the preferred treatment of choice for the long-standing lesions with unfavorable position. Patients who are in primary and mixed dentition needs scrupulous preservation and treatment of the permanent tooth buds, as involvement of permanent tooth bud crown in the dentigerous cyst could be ruinous for the child in many ways.[3] The case report reveals the case of a 6-year-old female with dentigerous cyst associated with unerupted permanent tooth 35 and its holistic management.

CASE REPORT

A 6-year-old female patient reported to the department of pediatric dentistry with the chief complaint of swelling in the lower left tooth region which was apparently enlarged and had led to the facial asymmetry. On general examination patient was apparently healthy. Medical history was nonsignificant. Clinical history revealed that the swelling started as a painless nodule which gradually increased to the present size over one month. On extra oral examination facial asymmetry was present on lower left side of the face with no sinus opening and discharge. The swelling was present at the posterior left region extending from corner of the mouth anterior to angle of mandible. (Fig.1).

Figure 1: Swelling on left side of the face.

On palpation the swelling was bony hard in consistency, nontender on palpation and nonreducible. Intra oral examination revealed carious 55,85 and grossly decayed 75 (Fig. 2).

Figure 2: Carious 55, 85 and grossly decayed 75.

The swelling intra orally extended from mesial of 75 to retromolar region from alveolar mucosa to vestibular region. Aspiration could not be performed because the cortex was intact. On radiographic examination orthopantomogram revealed unilocular well defined radiolucency associated with crown of unerupted mandibular left second premolar 35 (Fig. 3). Radiolucency had spanned across to the mandibular border beginning from mesial root of primary second mandibular molar 75 to the mesial root of permanent mandibular first molar 36 (Fig. 3).

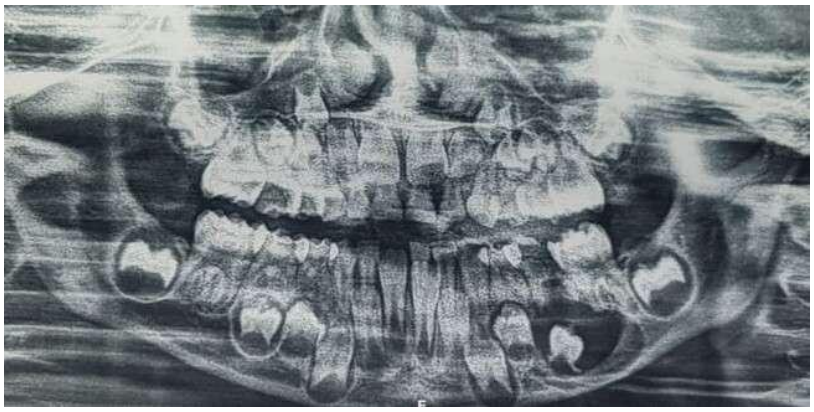

Figure 3: Orthopantomogram revealing unilocular radiolucency with the crown of unerupted left second premolar 35.

The roots of second primary mandibular molar 75 had shown resorption. After complete investigations as the radiographic examination revealed the involvement of mesial root of the permanent first molar 36 for which the pulp sensibility test was done and revealed that tooth 36 was sensitive to vitality testing. Moreover, crown of the unerupted permanent second premolar 35 whose root had yet not formed led to the, the treatment option of enucleation of the cyst along with the complete removal of the crown of unerupted second premolar 35 as the chances of recurrence after enucleation are less (Fig. 7). Prior to surgery blood investigations were carried out and the results obtained were in normal limits. After obtaining the informed consent, surgical intervention was performed under general anesthesia. Treatment procedure comprised of extraction of 75 (Fig. 4).

Figure 4: Extraction of 75.

The crevicular followed by releasing incisions (Fig. 5) were made, flap was reflected with periosteal elevator and with the help of burs, the bone was removed from distal of 74 to mesial of 36 (Fig.6).

Figure 5: Crevicular and Releasing incision.

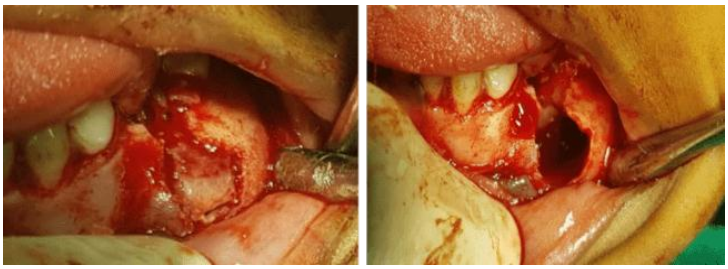

Figure 6: Bone removed from distal of 74 to mesial of 36.

Complete removal of the cyst in toto was done followed by copious irrigation so that remaining fragments and debris could get thoroughly washed off (Fig. 7).

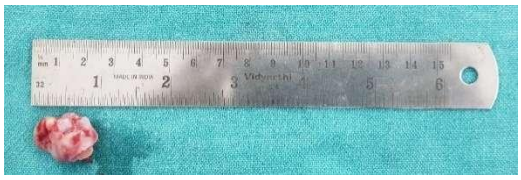

Figure 7: Enucleated cyst.

The Carnoy's solution was applied for five minutes as a cauterizing agent (Fig.8).

Figure 8: Carnoy's solution applied as cauterizing agent.

The removed cyst (Fig.7) was then histo-pathologically examined to confirm the diagnosis of dentigerous cyst (Fig.9, A&B).

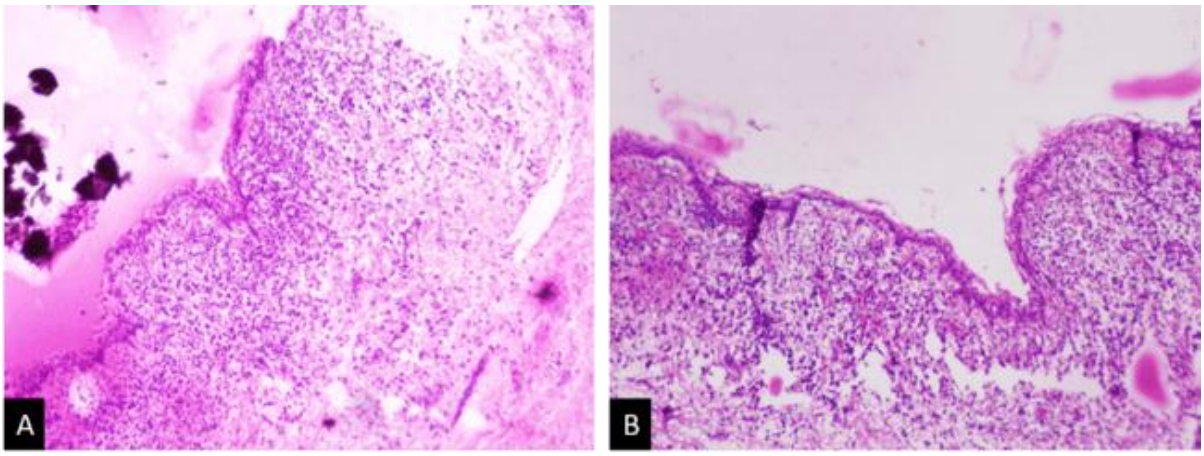

Figure 9: Histopathological examination showing A Thick hyperplastic non-keratinized stratified squamous epithelium with rete ridges and intense inflammation with proliferating and anastomosing rete ridges. B Dentigerous cyst lining shows proliferation and anastomosing rete ridges.

The sutures were placed and patient was advised to maintain good oral hygiene and povidone iodine mouth rinse was prescribed. The patient was recalled after one week for removal of sutures and post operative examination where in the band and loop space maintainer was planned for the space present between 74 and 36 followed by restoration of 55 and 85 (Fig.10, A&B).

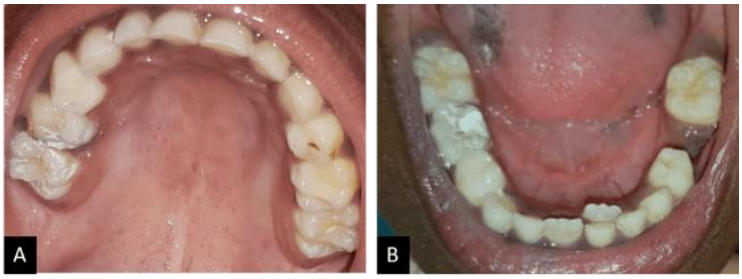

Figure 10: Post- operative A Restoration of 55. B Restoration of 85.

DISCUSSION

Dentigerous cyst is defined as an epithelium lined pathological cavity which arises from the enamel organ due to the alteration in the reduced enamel epithelium which encloses the crown of unerupted tooth at cementoenamel junction. After radicular cyst it is second most common odontogenic cyst.[4] Dentigerous cyst begins to develop through the accumulation of fluid with in the follicle enclosing the crown of the involved tooth between enamel organ and subjacent structures after completion of crown.[5] Although mostly dentigerous cysts are considered as the developmental cysts but sometimes in some cases seem to have an inflammatory origin hence termed as inflammatory follicular cyst. Inflammation which has been implicated as a stimulus for the proliferation of the epithelium.[6] As in the present case 75 was grossly decayed and was non vital, the pulp thus was necrotic. Inflammation of the pulp might have caused the stimulation of dormant cells like cell rest of malassez and cell rest of serres around the apex of the tooth root 75. Epithelial cell rest of malassez are the remanent of hertwig's epithelial root sheath which are left after the root of the tooth is completed. The source of the inflammation of pulp most commonly is the carious lesion as in the present case, however trauma or defective restoration could also contribute to the pulpal inflammation. As soon as the epithelial cell rest of malassez around the tooth apex are stimulated by pulpal inflammation the cyst origination begins. Al-Talabani and Smith also suggested that inflammation progressing from the root apex of the deciduous tooth leads to development of the dentigerous cyst around the unerupted permanent tooth.[7] In the present case inflammatory reaction associated with the apex of the carious primary second molar 75 might have stimulated the proliferation of the reduced enamel epithelium of the developing permanent second premolar 35, hence led to the cyst formation or other reason could be that the developing follicle of permanent second premolar was in close approximation to the inflammatory reaction at the apex of the degenerating primary second molar 75.

Benn and Altini considered another possible mechanism where the crown of the permanent tooth may erupt into a

radicular cyst of its deciduous predecessor that is extrafollicular origin.[8] The attachment of cyst wall to the neck of the associated tooth is the hall mark and important feature. Radiographically dentigerous cyst is of three types central, lateral, and circumferential variety. The present case is the central type of dentigerous cyst as has involved the crown of the unerupted tooth.

A radicular cyst associated with a deciduous tooth appears to be in a relationship with the erupting underlying permanent tooth. In such case the erupting tooth may indent rather than penetrate the wall of radicular cyst. For the correct diagnosis a radiographic and surgical evaluation followed by histopathological examination serves the purpose.

Histologically noninflammatory dentigerous cysts are lined by thin, nonkeratinized, stratified squamous epithelium which is chiefly responsible for protection. However, the severity of inflammation determines the change in the thickness of lining epithelium such rete ridges hyperplasia as seen in the present case (Fig.9, A&B). The clinical appearance and radiographic features of the present case revealed the dentigerous cyst but histopathological examination determined the inflammatory origin of dentigerous cyst. Johnson et al. reported the risk that occurs when considerable amounts of odontogenic epithelium remain within the affected bony cavity for a long duration.[9] In the present case the mesial root of permanent first molar 36 was also involved. Thus, the treatment modality for the dentigerous cyst in the present case was enucleation which is also called as Partsch II or Cystectomy. In enucleation whole cyst along with cystic lining is removed without damaging the adjacent structures and the recurrence rate decreases to a great extent. In the present case the cortical bone was intact cortical ostectomy was done by creating a window which allowed the complete removal of the cyst. The cyst can also be removed with periosteal if the bone overlying the cyst is very thin. Largest curette was used in the present case that fit in the bony cavity and prevented the tearing of cyst wall. The edge of the curette was pushed between the capsule of cyst and bony cavity where the convex surface of curette was towards the cyst to perform the stripping of the cyst and the concave surface was towards the bony wall. The Carnoy's solution was further used as cauterizing agent as it penetrates the cancellous space in the bone. It consists of glacial acetic acid, absolute alcohol, and ferric chloride. Carnoy's solution is the fixative agent where absolute alcohol hardens the tissue by shrinking it. Glacial acetic acid swells the tissue and prevents overhardening, Chloroform increases the speed of fixation and ferric chloride acts a dehydrating agent. The use of Carnoy's solution in the management of odontogenic cysts was popularised by Voorsmit in 1984 who reported a recurrence rate of only 2.5% when Carnoy's solution was used to treat the bony cavity after enucleation. Further many in vitro studies also revealed that the application of Carnoy's solution for 5 min penetrate 1.5 mm into cancellous bone but without penetration into the neurovascular bundle of the inferior alveolar nerve. In accordance with the use of carnoy's solution, study of Gosau *et al.* concluded that lesions treated by means of enucleation plus carnoy's solution had a recurrence rate of 14.3% whereas the ones treated with enucleation had a 50% of recurrences.[10]

In the present case the prognosis after the removal of the dentigerous cyst is good. The space between 74 and 36 after extraction of 75 shall be maintained by the means of space maintainer which further would be replaced by the prosthesis as the age advances. In differential diagnosis, odontogenic keratocyst and unicystic ameloblastoma was considered. OKC and unicystic ameloblastoma occur in the molar region of lower jaw but the radiography does not reveal the association with the roots of nonvital primary tooth and the crown of an unerupted permanent tooth.[1]

CONCLUSION

Some untreated dentigerous cyst have the potential to develop into odontogenic tumours such as ameloblastoma and malignancies such as squamous cell carcinoma and muco-epidermoid carcinoma. Hence early detection and proper treatment strategies prevents the comorbidities.

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