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Conservative management of a dentigerous cyst in a pediatric patient: A case report

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ABSTRACT: A dentigerous cyst or follicular cyst is an odontogenic cyst, thought to be of developmental origin, associated with the crown of an unerupted tooth. Such cysts, initially remain completely asymptomatic unless infected. Diagnosis and early treatment of these lesions in children is of great importance, especially in cases where the lesions enclose permanent teeth buds. This report presents a case of a dentigerous cyst, located in the left posterior region of the mandible of an 11 year old female patient, managed conservatively in order to preserve the associated permanent teeth.

KEYWORDS: Dentigerous cyst, Marsupialization, Odontogenic tumor

I. INTRODUCTION

Dentigerous cysts are the second most common of the cystic lesions that affect the mandible, and account for 14 to 20% of mandibular cysts and between 15.2 to 33.7% of all odontogenic cysts.[1] They generally appear during tooth development in youngsters but frequency of dentigerous cysts occuring in children have been reported low in dental literature.[2] These cysts are often asymptomatic unless there is an acute inflammatory exacerbation and, therefore, these lesions are usually detected on routine radiographic examinations.[3]

Dentigerous cysts originate from a change in the development of the reduced epithelium of the enamel organ, which results in an accumulation of fluid between this and the permanent tooth's crown.[4]In some instances, these cysts can grow to a very large size and can trigger the inflammation, expansion and erosion of the cortical bone. In such a case, they can generate a differential diagnosis as an ameloblastomaor an odontogenickeratocystic tumour. Radiographs show a unilocular radiolucent lesion with well-defined sclerotic margins that is associated with the crown of an unerupted tooth.[5] The complications associated with a dentigerous cyst include pathologic bone fracture, loss of permanent tooth, bone deformation, and development of squamous cell carcinoma.[6]

Since the cyst may increase in size, the classic approach is to remove the cyst together with the affected tooth, so as to allow the regeneration of healthy bone. At times, this approach is too aggressive and more conservative ones (such as decompression, marsupialization, etc.) should be considered, as they can be advantageous in the sense that they allow for the eruption of the teeth related to the cyst.[7] This paper presents a case of dentigerous cyst in a child, which was treated conservatively in order to preserve the associated permanent tooth.

II. CASE REPORT

An 11-year-old female patient was referred to the Department of Pediatric and Preventive Dentistry for the management of a radiolucent lesion in the left side of the mandible, found incidentally on a panoramic radiograph taken for orthodontic treatment planning. The patient had no associated complaints, but oral examination revealed a slight swelling of alveolar mucosa related to the primary second molar of the region. There was no history of any trauma or any discharge from the region. Medical history revealed

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no systemic illness. On extra-oral examination, a diffuse swelling was noted on left side lower jaw, with no sinus or signs of discharge. On intra-oral examination, the swelling was bony hard with expansion of buccal cortex in 75 region, which had a history of pulpectomy.

Radiological examination revealed a 1.8 cm × 1.4 cm sized, oval-shaped, unilocular radiolucency with a sclerotic border, involving the periapical region of 75, and horizontally displaced 35. The radiolucency extended from the distal aspect of the unerupted 34, involving the displaced 35 and extending to the mesial root of 36 posteriorly. Inferiorly, the extension was till the inferior cortex without involving it (Figure 1a).

Based on clinical and radiographical examination, a provisional diagnosis of a dentigerous cyst was made. The aspiration of the lesion was attempted, which revealed a yellowish straw-colored fluid (Figure 1c) with shiny cholesterol crystals, with high protein value.

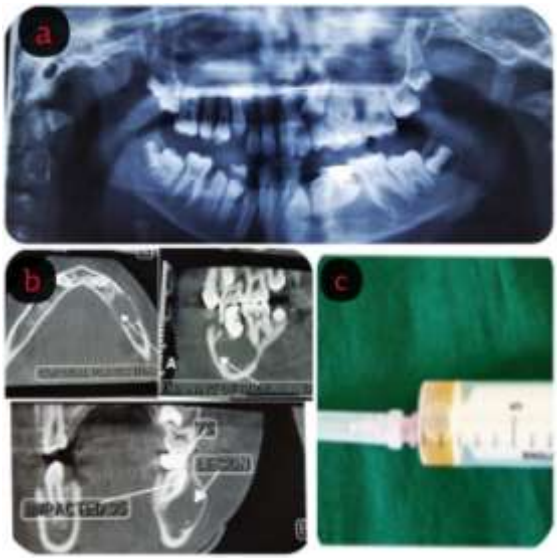

Figure 1, (a): Panoramic radiograph, (b): CT Images showing the presence of a well-defined unilocular hypo dense lesion on the left side of the mandible, involving the periapical region of 75 and horizontally impacted 35, (c): Straw-colored aspirated fluid.

When clinical presumptions are made about dentigerous cysts, the treatment comprises the removal of the lesion, which in this case would have entailed the removal of second premolar and first permanent molar, careful dissection of the inferior alveolar nerve, possibility of sustaining a mandibular fracture and a change in the patient's mandibular growth. For this reason, more conservative and less traditional treatment options were explored.

Surgical marsupialization and minimal curettage was done after extraction of deciduous second molar, followed by primary closure ofwound (Figure 2). Curetted specimen was sent for histopathological examination, which revealed the cystic wall lined by 2-3 layered thick flattenedsquamous epithelium with occasional presence of mucosal cells.Suture removal was done after one week, the healing was uneventful. Radiographic follow-up was performed periodically. The involved permanent teeth including the horizontally displaced 35, erupted naturally without any traction forces and adjacent teeth remainedhealthy. A slight rotation of 35 was noted, which could be easily resolved by orthodontic alignment. The radiographic follow-up of 1 year showed no recurrence of lesion. (Figure 3) Interestingly, an incidental finding of a supernumerary tooth of the 4th quadrant was seen on the follow-up radiograph, which is being monitored and an extraction would be considered on follow-up.

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Figure 2, (a): Pre-operative intraoral appearance, (b): Opening of the cystic cavity, (c): non-watertight suture & (d) Follow up intraoral image section, 1 year after the first surgical intervention.

Figure 3; follow up panoramic radiograph after 1year showing 35 erupting in place, size of the lesion decreased with progressive bone formation at the region and an incidental finding of a supernumerary tooth of 4th quadrant.

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III. DISCUSSION

Dentigerous cysts are usually solitary, benign developmental odontogenic cysts associated with the crowns of unerupted teeth. Occurrence of dentigerous cysts according to shear, is usually in the 3rd and 4th decades.[8] In contrast to this finding, Y Shibata et al. showed that the age of discovery of the dentigerous cyst was generally 9-11 years.[9] This patient was also 11-year-old; the difference in age-wise prevalence of dentigerous cyst may be attributed to the difference in ethnicity of the population examined.Dentigerous cysts in young adults are seen associated with 3rd mandibular molars,[10] but, in this patient, the cyst was associated with an unerupted mandibular second premolar, and the same findings were reported in the previous study on the Japanese, where the lower premolar region was the most common site of occurrence of dentigerous cyst.[9]

According to Benn and Altini,[1] three feasible mechanisms exist for histiogenesis of the dentigerous cysts. Developmental dentigerous cyst forms from dental follicle and becomes secondarily inflamed, and the source of inflammation is usually a non-vital tooth. The second type develops from a radicular cyst, which forms at apex of a non-vital deciduous tooth. The permanent successor erupts into the radicular cyst and results in adentigerous cyst that is extra follicular in origin. Third type is due to peri-apical inflammation from a non-vital deciduous tooth or other source, which spreads to involve the follicle of the permanent successor, and as a result of the inflammatory exudate, dentigerous cyst formation occurs, which could be the case, in this patient.For this reason, especially in mixed dentition, it is very important to establish not only a clinical but also a radiological follow-up protocol of the endodontically treated primary molars until the eruption of their permanent successors, to be able to detect as soon as possible, any adverse effects of pulp therapy of primary teeth and to manage them in prompt time.[11]

There are two theories to explain the association of these cysts with the lower primary second molars. The first is the susceptibility of the lower primarysecond molar to caries. The second is that the germ of the premolar is closer to the primary second molar. [12]

Various therapeutic options are detailed in literature, about the management of dentigerous cysts in children, which include the complete enucleation of these lesions with exodontia of the affected teeth, as well as other conservative options such as marsupialization and decompression, either with or without traction of the tooth to its correct position in the arch.

Marsupialization and decompression is a minimal surgical intervention which requires a smaller bony window.The benefits are maintenance of pulp vitality, prevention of bony fractures, preservation of the inferior alveolar nerve or maxillary sinus, and preservation and eruption of the permanent teeth.[13]Yahara[14] and Hyomoto[15] have found that between 71.4 and 72.4% of the individuals who participated in their study presented with natural eruption of teeth enclosed in the cyst, after having carried out marsupialization.

After minimal surgical intervention, the spontaneous eruption may occur in approximately 70 to 90% of cases. The length of the eruption is very variable, ranging from seven months to five years, and orthodontic traction can be associated.[16]

A study byFujii et al.[17] indicated that the probability of eruption of a permanent tooth enclosed in a dentigerouscyst increases in patients over the age of 10, in cases where their tooth has a depth less than 5.1 mm and where the angle of displacement of the tooth is less than 25º and the space between adjacent teeth was greater than the size of the teeth. Though the angle of displacement of the involved tooth was greater in this case,marsupialization of the cyst was decided and performed,as other factors were favourable and would minimize the harm to the patient. One year post-operative result showed good prognosis of the lesion with favourable eruption of the involved tooth and progressive bone formation in the cystic region.

IV. CONCLUSION

The diagnosis and early treatment of cystic lesions of the jaws in children, such as those presented in this article, is of great importance when lesions enclose unerupted permanent teeth, in order to minimize the associated damages. Whenever possible, a conservative approach should be adopted, one that allows for the maintenance of the dentition and treatment of the associated cyst so as not to compromise either the occlusion or the general well-being of these patients.

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