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An infected dentigerous cyst associated with an impacted permanent maxillary canine, inverted mesiodens and impacted supernumerary teeth

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ABSTRACT

A dentigerous cyst is an odontogenic cyst associated with the crown of the impacted or unerupted teeth. Such cyst remain initially completely asymptomatic unless when infected and can be discovered only on routine radiographic examination. Here, such a case of dentigerous cyst, which was discovered on routine radiographic examination, is discussed here.

KEY WORDS: Dentigerous cyst, impacted supernumerary teeth, mesiodens

A patient named Ravindran of age 32 has come to our Department of Oral Medicine Vivekanandha Dental College and Hospitals with the chief complaint of pain in the upper front tooth region for the past 1 month. History revealed that patient had a history of trauma to his upper front tooth region 10 years back. Pain started in his upper front teeth region 1 week before in his upper front tooth region. Pain is dull, continuous, non-radiating in character. Pain gets aggravated during mastication of food substances. On intra-oral clinical examination, clinically missing 11, 13 seen. Presence of swelling seen involving the palatal aspect of attached gingiva and marginal gingiva in relation to treatment partial denture seen replacing the crown of 11, 12 and 21. On further intraoral examination, during palpation pus discharge seen from the gingival sulcus with tenderness on palpation in relation to palatal aspect of the removable partial denture in relation to 11, 12, 21. On intra-oral hard tissue examination, missing teeth 16, 26 and grossly decayed 25, pit and fissure caries 17, 18 and 28 rotated 23 seen [Figure 1].

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Iopa and topographic maxillary occlusal radiograph taken in relation maxillary anterior teeth region revealed the presence of a well-defined radiolucency attached to the cervical region of the crown of 13 situated within the alveolar bone of maxilla. It also revealed the presence of inverted tooth like radiopacity resembling the morphology of crown and root situated within the alveolar bone of anterior maxillary region in relation to the apical region of root of 21 suggestive of inverted mesiodens. In addition, it also revealed the presence of another tooth like radiopacity resembling the morphology of crown and roots suggestive of additional impacted supernumerary teeth [Figures 2 and 3].

Orthopantamogram revealed the presence of a well-defined radiolucency surrounded by a well-defined radiopaque border surrounding the cervical area of the crown of 13, inverted mesiodens and additional impacted supernumerary teeth suggestive of dentigerous cyst [Figure 4].

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Figure 1: Intraoral clinical photograph



Figure 3: Topographic maxillary occlusal radiograph

Treatment

Under local anesthesia the discolored ill-fitting maxillary treatment partial denture is removed and a mucoperiosteal flap is reflected in relation to the palatal aspect of 11, 12, 21, 22 region [Figure 5]. The dentigerous cyst is enucleated with a surgical curette and the impacted right maxillary permanent canine 13, mesiodens and an additional malformed small sized supernumerary teeth associated with the dentigerous cyst is removed [Figure 6]. It is then sutured with 3-0 black silk suture and the suture is removed after 7 days. Post-operative healing was satisfactory and recurrence did not occur.

Review of Literature

A dentigerous cyst or follicular cyst is an odontogenic cyst - thought to be of developmental origin - associated with the crown of an unerupted (or partially erupted) tooth. The cyst cavity is lined by epithelial cells derived from the reduced enamel epithelium of the tooth forming organ. Regarding its pathogenesis, it has been suggested that the pressure exerted by an erupting tooth on the follicle may obstruct venous flow

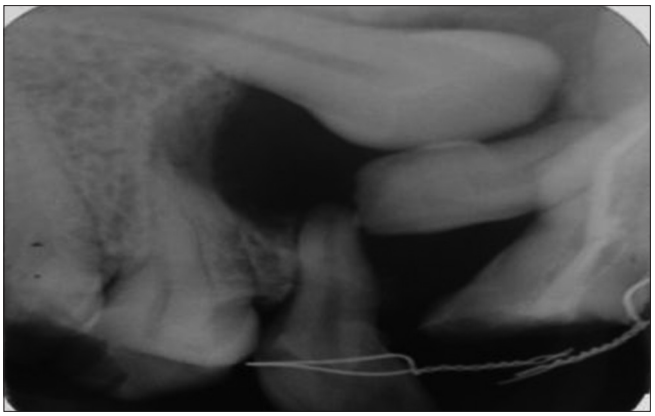


Figure 2: Intra oral periapical radiograph



Figure 4: Orthopantamograph

inducing accumulation of exudate between the reduced enamel epithelium and the tooth crown.[1]

In addition to the developmental origin, some authors have suggested that periapical inflammation of non-vital deciduous teeth in proximity to the follicles of unerupted permanent successors may be a factor for triggering this type of cyst formation.[2]

Histologically, a dentigerous cyst is lined by non-keratinized stratified squamous epithelium. Since the dentigerous cyst develops from follicular epithelium it has more potential for growth, differentiation and degeneration than a radicular cyst. Occasionally, the wall of a dentigerous cyst may give rise to a more ominous mucoepidermoid carcinoma. Due to the tendency for dentigerous cysts to expand rapidly, they may cause pathological fractures of jaw bones.[3] The usual radiographic appearance is that of a well-demarcated radiolucent lesion attached at an acute angle to the cervical area of an unerupted tooth. The border of the lesion may be radiopaque. The radiographic differentiation between a dentigerous cyst and a normal dental follicle is based merely on size. Radiographically, a dentigerous cyst should always be differentiated from a normal dental follicle. Dentigerous cysts are the most common cysts with this radiographic appearance. Radiographically the cyst appears unilocular with well-defined

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Figure 5: Palatal mucoperiosteal flap reflected

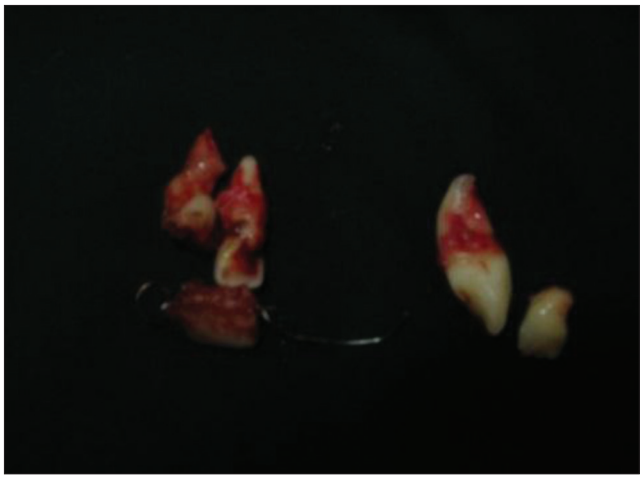


Figure 6: Post surgical photograph

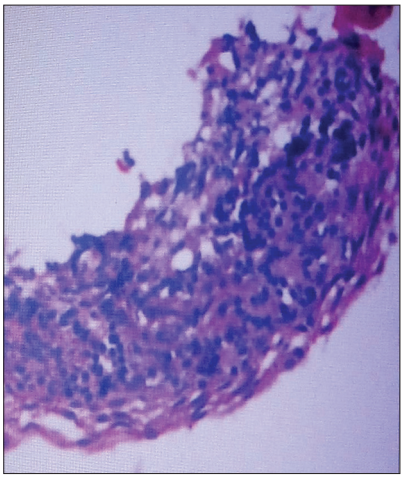


Figure 7: Histological photomicrograph (H and E, ×40 reveals the presence of inflammatory cells on the walls of the cystic cavity)

margins and often sclerotic boarders. Infected cysts show ill-defined margins.[3]

The most common location of dentigerous cysts are the mandibular 3rd molars and the maxillary canines and they rarely involve deciduous teeth and are occasionally associated with odontomas.[4]

Discussion

Dentigerous cyst is one that encloses the crown of an unerupted tooth by expansion of the follicle and is attached to its neck. The term dentigerous is preferred, the literal meaning being "tooth bearing."[1] Dentigerous cyst is associated with an unerupted tooth. In order of its frequency, they are associated mandibular third molars, maxillary canines, mandibular second premolars and maxillary third molars.[5] They may also occur around supernumerary teeth; however, they are only rarely associated with primary teeth.[5,6] Our case was related with permanent maxillary canine. These cysts can grow to very large size and can cause displacement of teeth or in few cases it may remain relatively small. The age range varies widely, from 5 years to 57 years.[3] Many dentigerous cysts are small asymptomatic lesions that are discovered serendipitously on routine radiographs, although some may grow to considerable size causing bony expansion that is usually painless until secondary infection occurs. Since cysts can attain considerable size with minimal or no symptoms, early detection and removal of the cysts is important to reduce morbidity. Moreover, almost all of the reported cases including the present case, present without pain and discovered during the investigation of asymptomatic slowly-growing swellings. Radiographically, the dentigerous cyst presents as a well-defined unilocular radiolucency, often with a sclerotic border. Since the epithelial lining is derived from the reduced enamel epithelium, this radiolucency typically and preferentially surrounds the crown of the tooth. A large dentigerous cyst may give the impression of a multilocular process because of the persistence of bone trabeculae within the radiolucency. However, dentigerous cysts are grossly and histopathologically unilocular processes and probably are never truly multilocular lesions.[3] Three types of dentigerous cyst have been described radiographically: The central variety, in which the radiolucency surrounds just the crown of the tooth, with the crown projecting into the cyst lumen. In the lateral variety, the cyst develops laterally along the tooth root and partially surrounds the crown, the circumferential variant exists when the cyst surrounds the crown but also extends down along the root surface as if the entire tooth is located within the cyst. Our case was radiographically a classic presentation of the circumferential variety. The histological features of dentigerous cysts may vary greatly depending mainly on whether or not the cyst is inflamed. In the non-inflamed dentigerous cyst, a thin epithelial lining may be present with the fibrous connective tissue wall loosely arranged with inflammatory cells [Figure 7]. As the lining is derived from reduced enamel epithelium it is 2-4 cell layer thick primitive type. The cells are cuboidal or low columnar. Retepegs formation is absent except in cases that are secondarily infected. As the connective tissue wall is derived from the dental follicle of developing enamel organ, it is a loose connective tissue stroma, which is rich in acid mucopolysaccharides. In the inflamed dentigerous cyst, the epithelium commonly demonstrates hyperplastic rete ridges and the fibrous cyst wall shows an inflammatory infiltrate. Rarely sebaceous glands in the walls are observed. The content of the cystic lumen is usually thin watery yellow fluid and is occasionally blood tinged. Histopathogenesis of dentigerous cyst is based on intra-follicular and extra-follicular theories. There can be no good reason for

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the extra-follicular theory of origin of dentigerous cysts as the evidence is that those reported as arising in this manner all appear to been envelopmental or follicular odontogenic keratocyst.[3] Intra-follicular theory postulates the possibility of cyst formation due to fluid accumulation between the layers of inner and outer enamel epithelium after the formation of crown. Main's theory:[7] The impacted tooth exerts pressure on the follicle which obstructs the venous outflow and induces rapid transudation of serum across the capillary walls. The increased hydrostatic pressure exerted by this pooling of fluid causes separation of the crown from the follicle with or without reduced enamel epithelium. The osmolality of the cyst fluid is modified by increased permeability to glycosaminoglycans such as hyaluronic acid, heparin and chondroitin sulphate, which causes expansile growth rapid.[2] Edamatsu *et al*. examined the expression of Fas, bcl-2 and single stranded deoxyribonucleic acid in dental follicles to classify the possible role of these apopstosis related factors in the pathogenesis of dentigerous cyst.[8] Fas is a cell surface glycoprotein that transmits apoptotic signals from the cell surface to the cytoplasm while bcl-2 proto-oncogene encodes a protein that inhibits apoptosis. Most dentigerous cysts are treated with enucleation of the cyst and removal of the associated tooth. Large dentigerous cysts may be treated with marsupialization when enucleation and curettage might otherwise result in neurosensory dysfunction or pre-dispose the patient to an increased chance of pathological fracture. Occasionally, it transforms to squamous cell carcinoma, mucoepidermoid carcinoma or ameloblastoma from or in association with a dentigerous cyst.[9-11] The prognosis for most histopathologically diagnosed dentigerous cysts is excellent, recurrence being a rare finding.[3,5]

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