Case Report
Dentigerous Cyst in Maxillary Sinus: A Rare Occurrence
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Abstract
An ectopically erupted tooth associated with a dentigerous cyst in the maxillary sinus presents itself as a confounding problem which may lead to maxillary sinusitis. One such case of a dentigerous cyst associated with an ectopic maxillary 3rd molar tooth in the right maxillary sinus cavity is presented which is of interest because of its presence within the maxillary sinus which has been very rarely documented. Investigations like computed tomography were carried out to confirm the extent of the lesion and the management of the cyst was done by the Caldwell-Luc procedure which is still popular to this day. The theoretical aspects of such dentigerous cysts are also reviewed here.

Key words: Dentigerous Cyst; Odontogenic; Jaw Cyst; Ectopic Tooth Eruption; Molar Third; Maxillary Sinus.

Introduction
Dentigerous cysts are the most frequent type of developmental odontogenic cysts derived from the epithelial remnants of the tooth-forming organ. 1 It is defined as a cyst that originates by separation of follicle from around the crown of an unerupted tooth. Most often the involved tooth is the mandibular third molar. 2 It may also be associated with an impacted, supernumerary or an ectopically erupted (eruption of a tooth in sites other than the natural position) tooth. Most common ectopically erupted teeth observed are third molars. Rarely a tooth or root may be present within the sinus cavity. 3 Such a tooth may be associated with dentigerous cyst around it. 4 An ectopically erupted tooth associated with a dentigerous cyst in the maxillary sinus presents itself as a confounding problem which may lead to maxillary sinusitis. This article describes a case of dentigerous cyst arising from an ectopically erupted right maxillary third molar present in the maxillary sinus causing sinusitis.

Case report
A 19 year-old male reported with chief complaint of purulent discharge from the right nostril and also salty discharge from behind the second maxillary molar since six months. Despite being treated with antibiotics by medical practitioners the discharge persisted. On clinical examination the right third molar was missing and tenderness was elicited over the right maxillary sinus. An Orthopantomograph (OPG) and Computed Tomography (CT) were advised which revealed the presence of an ectopically erupted tooth within the sinus cavity under OPG and the axial sections of CT at the level of the maxillary sinus show a definite hyper dense area surrounded by an isodense area with a breach at the posterior wall of the sinus cavity suggestive of a tooth surrounded by soft tissue (Fig 1). This was indicative of an infected dentigerous cyst in right maxillary sinus.

The condition was then treated by removal of the tooth with cyst enucleation by Caldwell luc procedure under general anesthesia. A transvestibular incision was placed extending from first molar to a vertical releasing incision between the lateral and central incisor. A bony window was created and the tooth was removed with enucleation of cystic lining (Fig 2a & b). The cavity was irrigated and packed with gauze. Haemostasis was achieved and wound was closed with sutures. The gauze pack was removed after 72 hrs via an oral antrostomy. The patient was asymptomatic till the follow up period of three weeks.

Histopathology of the soft tissue revealed a cystic lesion lined by flattened cells of stratified squamous epithelium and at places covered by granulation tissue and infiltration by mononuclear cells. These features were suggestive of an infected dentigerous cyst (Fig 2c).


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Figure 1: An orthopantomograph shows a tooth within the right maxillary sinus (a) and a CT scan shows hyperdense area within the sinus cavity attached to the posterior wall (b).

Figure 2: Bony window created in anterior wall of right maxillary sinus via Caldwell-Luc approach (a). The macroscopic examination included the enucleated cyst fragments along with the tooth (b) and the Histopathology revealed odontogenic epithelial lining of about 4-5 cell layers thick with a fibrous connective tissue wall showing few inflammatory cells and areas of hemorrhage (c).

Discussion
The Dentigerous cyst arises from the enamel organ after amelogenesis is completed. Many different factors are involved in the development of these cysts. There are two different views which are the congenital anomaly view and the stimulatory view by inflammation. The dentigerous cyst is formed due to fluid accumulation leading to separation of enamel epithelium of the unerupted tooth from the surface. Due to the increase of osmolality inside the cyst caused by albumin, immunoglobulin and squamous debris, fluid flows into the cyst and causes increased pressure that leads to engorgement of the cyst. Followed by the growth of the cells covering the inner cavity of the cyst, collagenase and osteoclast activating factor are secreted by the epithelium and the cyst grows. It encloses the crown of an unerupted tooth and is attached to the cementoenamel junction.

Dentigerous cysts take up about 24% of all jaw cysts. It usually occurs in 2nd and 3rd decades of life. There is a male preponderance for white patients. The sex distribution ratio being 1.84:1 (male:female). A substantial majority of dentigerous cyst involved the mandibular third molar. The maxillary permanent canine is next in order of frequency of involvement, followed by mandibular premolars and maxillary third molars. The maxillary third molar is involved in third decade of life. Eliasson et al. reported a 1% occurrence of these cysts in an impacted upper third molar tooth. Prevalence of mandibular cyst is twice more common than maxillary cyst. Dentigerous cyst associated with an ectopically erupted tooth within the maxillary sinus is a very rare occurrence.

Generally these cysts are painless and remain dormant; though they may cause some expansion of cortical bone. If dentigerous cyst gets infected it shows inflammatory symptoms such as facial swelling, sensory changes. The formation of fistula can occur especially when present in maxillary sinus presents itself as sinusitis with purulent discharge.
Dentigerous cysts are often found during routine dental radiographs taken for a missing tooth or because teeth are tilted or otherwise out of alignment. It presents itself as well-defined unicocular radiolucency with sclerotic border associated with the crown of an unerupted tooth. Occasionally, trabeculations may be seen giving an impression of multilocularity. Three radiologic variants of dentigerous cysts are observed. They are central variety, lateral variety and circumferential variety. In the case presented here was classified as a central variety.

The histopathological findings of dentigerous cysts are generally nonkeratinizing stratified squamous epithelium consisting of 2-4 cell layers. Mucous cells take up 25-50% of all cells that cover the inner wall of the cyst. Other cells such as ciliated cells, cuboidal cells, columnar cells, hyaline bodies or sebaceous elements are rarely detected and invasion of inflammatory cells can be found. In our experience, the inner wall of the cyst was covered with stratified squamous epithelium and cuboidal cells, ciliated columnar cells and goblet cells. On rare occasions, squamous cell carcinoma, mucoepidermoid carcinoma or ameloblastoma can develop in dentigerous cysts.

Computed Tomography is very useful in diagnosis of maxillary sinus pathologies. However, routine CT imaging is reserved for large lesions in particular those involving the maxilla, in which case nasal cavity, orbital, or pterygomaxillary space extension may have occurred. In our case, CT images allowed better depiction of the involved structures and all of the paranasal sinuses.

There are mainly two treatment options for dentigerous cyst, either by enucleation or marsupialisation. In adults the impacted teeth normally have a slim chance to erupt therefore enucleation is a better treatment. As in our case the dentigerous cyst is associated with a tooth in maxillary sinus the treatment plan will deviate from a typical case. To avoid formation of an oroantral fistula marsupialisation was not performed so the treatment of choice was enucleation and removal of tooth via Caldwell-Luc approach. The Caldwell-Luc operation, originally described in the late 1800s, is an approach to the maxillary sinus through the labio-gingival sulcus and canine fossa. Caldwell-Luc and inferior antrostomy approaches are reserved for rare circumstances like this. The prognosis is excellent and recurrence is rarely observed after enucleation. The sequel of these cysts and ectopic teeth vary from obstruction of the sinus to blindness.

**Conclusion**

Our patient presented with a history of purulent discharge from the right nostril since six months. After radiologic and tomographic evaluation a diagnosis of dentigerous cyst associated with an ectopic maxillary third molar within the maxillary sinus cavity was established. The possibility of dentigerous cysts may always be considered in cases with maxillary sinus haziness on radiological findings. Enucleation of the cyst along with removal of the tooth was carried out via Caldwell-Luc procedure. Histopathological examination of the cyst ruled out any associated malignancies. The benefits of surgery should always outweigh the risks, a ratio that is only elucidated via a thorough workup and evaluation. The recovery has been uneventful.

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**References**


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