

**DENTIGEROUS CYST: CONE BEAM COMPUTED TOMOGRAPHY FINDINGS OF A CASE**<sup>1</sup> Arpita Rai<sup>1</sup> Assistant professor<sup>2</sup> Vanita Vaishali<sup>2</sup> In private practise<sup>1</sup>Department of Oral Medicine and Radiology, Faculty of Dentistry, Jamia Millia Islamia, New Delhi<sup>2</sup> Dental practitioner, Ranchi

**ABSTRACT:** Background: Dentigerous cyst is a common odontogenic cyst associated with impacted tooth. Imaging of this entity poses a challenge. Case details: We present an interesting case of dentigerous cyst in a 30-year old male patient, which developed around an impacted 13. Histological examination revealed a cyst with stratified squamous epithelium of varying thickness. Cone-beam computed tomography (CBCT) is an emerging technology finding application in all branches of dentistry. The current case report highlights the application of CBCT in the preoperative assessment of dentigerous cyst of the jaw. CBCT revealed a well defined unilocular radiolucent lesion involving right maxilla associated with impacted 13. Conclusion: The current case report describes the significant contribution of CBCT in the planning and successful surgical management of dentigerous cysts and associated impacted teeth.

**KEYWORDS:** Dentigerous cyst, Cone beam computed tomography, CBCT, Maxillary canine, radiography

**INTRODUCTION**

A dentigerous cyst encloses the crown of an unerupted tooth, attaching to the neck of the tooth, and grows by expansion of its follicle. It is classified as a developmental cyst by the World Health Organization.<sup>1</sup> Dentigerous cyst is the most prevalent type of odontogenic cysts and is associated with crown of an unerupted tooth, and mainly involves crown of impacted mandibular third molar, followed by maxillary canines, mandibular premolars, rarely supernumerary teeth<sup>2</sup> and central incisors.<sup>3</sup> Dentigerous cyst is the second most common cyst of the oral cavity after radicular cyst.<sup>4</sup> It accounts for 24% of all the true jaw cyst with frequency of 1.44 cyst for every 100 unerupted tooth in general population.<sup>5,6</sup>

Dentigerous cyst is a type of odontogenic cyst formed by the separation of the follicle from the crown of an unerupted tooth, is more common in males and occurs more commonly in the second or third decade of life.<sup>7</sup> About 70% of the dentigerous cysts occur in the mandible and 30% in the maxilla.<sup>8,9</sup> The cyst being asymptomatic may attain a large size with resorption of the roots of teeth till it manifest clinically or become evident radiographically. Radiographic evaluation of dentigerous cyst includes conventional radiographs like intra oral periapical radiograph, occlusal radiographs; orthopantomograms and advanced imaging modalities like conventional computed tomography or cone beam computed tomography (CBCT). The imaging assessment enables us to detect the extent of large lesions, identify anatomical relationships, and assess the margins of the lesion to ascertain the presence of infiltrative growth suggestive of development of an aggressive lesion.

Untreated dentigerous cysts may in rare cases grow large and have the potential to develop into an odontogenic tumor such as ameloblastoma or to become malignant as in oral squamous cell carcinoma and mucoepidermoid carcinoma.<sup>10</sup> The standard treatment for a dentigerous cyst involves surgical enucleation and extraction of the cyst-associated impacted or unerupted tooth<sup>11,5</sup> but long time for follow-up is required to rule out postoperative recurrence and postoperative cystic development.<sup>6</sup>

**Case report**

A 30-year-old male patient reported to the Department of Oral Medicine and Radiology with complain of swelling in the upper front teeth region since 3 years. Patient had noticed a swelling in the anterior palate region 3 years back which was small in size. The swelling had gradually increased to present size over a period of 3 years. About 3 months back patient reported having pain associated with the swelling and pus discharge from the lesion. Patient had then consulted local doctor and medications were prescribed (details not known). Relief of pain and pus discharge was reported but swelling persisted. Swelling had further increased to the present size in last 3 months but was not associated with pain or pus discharge when patient reported to the Department of Oral Medicine and Radiology. Intraoral examination revealed a solitary swelling present on right side of hard palate extending from 21 to 16 (**Fig.1**). The swelling extended from palatal gingiva to the midline and crossed the midline in the region of premolars. The swelling was approximately 5 x 5 cm in size, irregular in shape, had smooth surface and

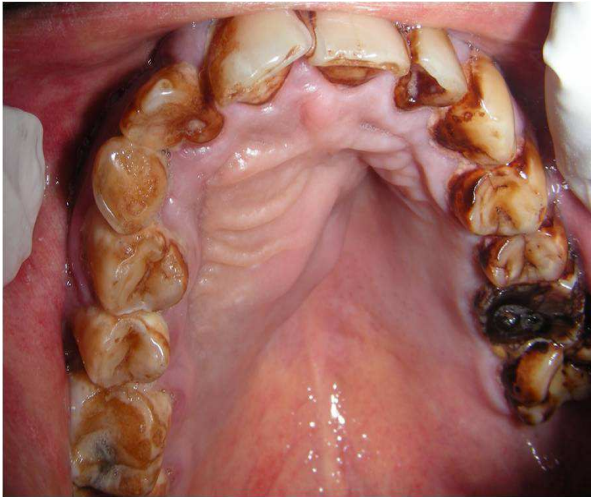


Fig. 1: Intraoral photograph of the patient showing a solitary swelling present on right side of hard palate. Also seen is the attrited retained 53.



Fig.2:Maxillary topographic occlusal view showing well-defined radiolucent lesion present on right side of the palate crossing the midline in the premolar region.



Fig. 3: Panoramic radiograph showing unilocular radiolucent lesion extending from 22 to mesial surface of 18 having well corticated border and attached at cement-enamel junction (CEJ) of vertically impacted 13

well defined borders. Presence of sinus opening in the posterior part of swelling close to midline was seen. On palpation inspeactory findings of size, shape, borders was confirmed. The swelling was firm in consistency in the centre and bony hard in the periphery. It was non-tender and pus discharge from the sinus opening was not observed at the time of examination. Grade II mobility in relation to retained 53 and Grade I mobility with 15, 16 was observed. Clinically 13, 18, 28, 38 and 48 were missing. There was root stumps in relation to 46 and 26 was grossly decayed. Pulp vitality tests revealed no response on electrical pulp vitality test (EPT) in relation to 53, delayed response to 21 and normal response to 11, 22, 12, 14, 15, and 16. Cold test was positive in relation to 11, 21, 12, 15, 16, 14, 22 and negative for 53. Based on the history, examination and chair-side investigations a provisional diagnosis of dentigerous cyst in relation to

impacted 13 was made. Differential diagnosis to this swelling included radicular cyst in relation to the retained 53, Calcifying epithelial odontogenic cyst, Calcifying epithelial odontogenic tumor, Adenomatoid odontogenic tumour.

Routine laboratory investigations of complete blood count, kidney function tests, liver function tests and routine urine analysis were normal. Maxillary topographic occlusal view (**Fig.2**) revealed well-defined radiolucent lesion present on right side of the palate which crossed the midline in the premolar region. The lesion had well corticated border. Impacted 13 and displacement of root of 12 mesially was observed. Diagnostic panoramic radiograph (**Fig.3**) showed a unilocular radiolucent lesion extending from 22 to mesial surface of 18 having well corticated border. The radiolucency was unilocular and

attached at cement-enamel junction (CEJ) of vertically impacted 13. The radiolucency extended superiorly from the level of hard palate to inter-radicular bone inferiorly. Displacement of crown of 12 laterally and root medially was observed. No internal calcifications were appreciable. Cone beam computed tomography (CBCT) revealed well defined unilocular radiolucent lesion involving right maxilla associated with vertically impacted 13 (Figure 4a). The radiolucency was 63.5 X 32.8 X 25.1 mm in its greatest dimension and attached to CEJ of 13 (impacted). The lesion had well-defined sclerotic borders with thickened cystic lining. The lesion had displaced the sinus floor superiorly, lateral nasal wall medially and palatal vault inferiorly.

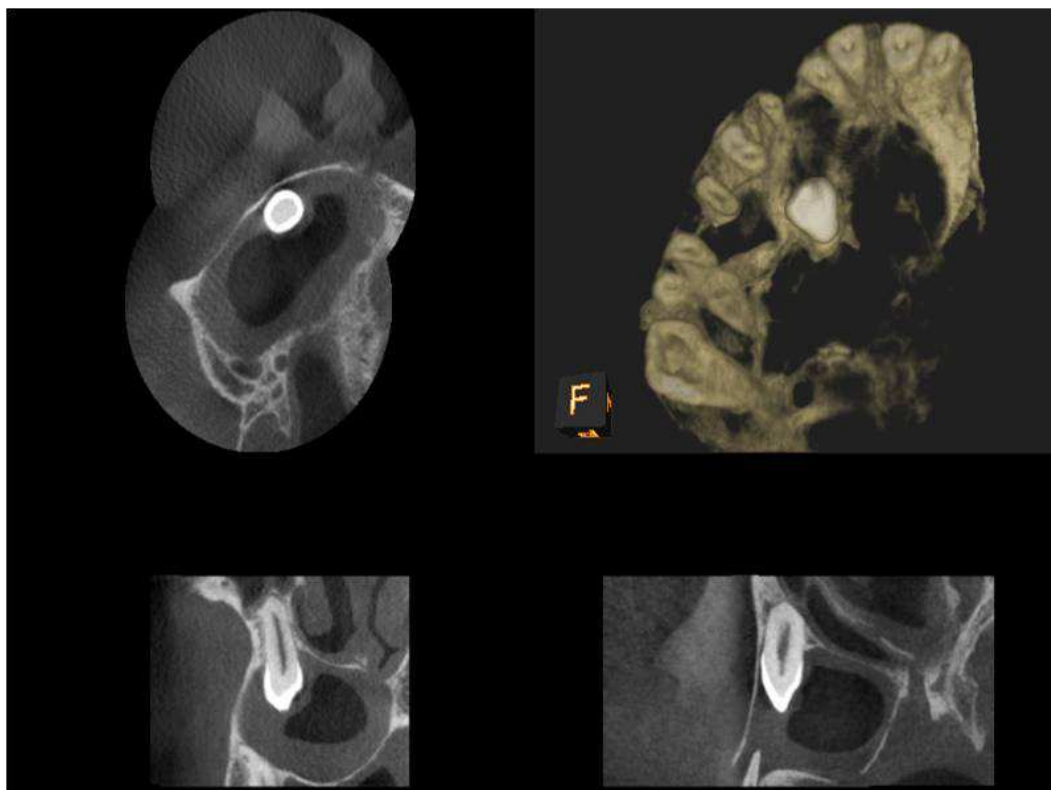
Fine needle aspiration revealed blood tinged aspirate which showed chronic inflammatory cells on microscopic examination. Histopathological examination ( Fig.5.) revealed stratified squamous epithelium of varying thickness. Numerous rete peg formation and area of basilar hyperplasia were present.

Evidence for keratinising superficial cells was present throughout the length of epithelium. Perivascular aggregate of chronic inflammatory cells infiltrate was seen. Myxoid degeneration was present in some areas and areas of focal archading were evident in few sections.

Based on the history, examination findings and supported by radiological and histopathological investigations, diagnosis of infected dentigerous cyst associated with impacted 13 was made. Intentional RCT in relation to 21,12,11,14 and 15 was carried out, followed by enucleation of dentigerous cyst and removal of impacted 13 (Fig.6). On first follow up, wound healing was satisfactory however, dehiscence was present on palatal surface. Patient was advised to use feeding plate. Pus discharge from labial vestibule was observed, culture and sensitivity showed sensitivity to penicillin and erythromycin. On second and subsequent follow-ups no fresh complaints were reported by the patient. Patient was advised to maintain oral hygiene and regular follow-up.

**DISCUSSION**

A dentigerous cyst encloses the crown of unerupted teeth and develops by expansion of its follicle. The considerable majority of dentigerous cysts involve the mandibular third molar and the maxillary permanent canine, followed by the mandibular premolars, maxillary third molars and rarely the central incisors.<sup>11</sup> Studies have shown that the incidence rate of dentigerous cysts



**Fig. 4:** Screen shot of Cone beam computed tomography (CBCT) imaging showing A) volumetric rendering B) Sagittal section C) coronal section D) Axial section; showing a well defined unilocular radiolucent lesion involving right maxilla associated with vertically impacted 13.

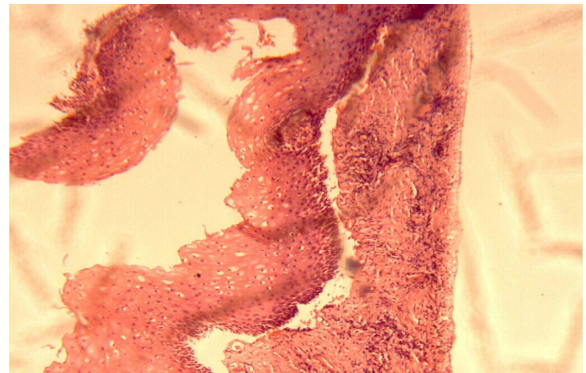
involving the maxillary central incisor was 1.5% as compared to 45.7% involving the mandibular third molar.<sup>11</sup> Mourshed<sup>5</sup> stated that 1.44% of impacted teeth undergo dentigerous cyst transformation. Daley *et al*<sup>6</sup> reported an incidence rate of 0.1-0.6%, whereas Shear found the incidence to be 1.5%.<sup>11</sup> In a recent study, Zhang *et al*.<sup>12</sup> evaluated 2,082 cases of DC and found that the mandibular third molars, followed by the maxillary canines, were the most affected teeth by the disease, rarely affecting other teeth.

Dentigerous cysts most commonly occur in the 2<sup>nd</sup> and 3<sup>rd</sup> decades of life. These lesions can also be found in children and adolescents and show a male predilection.<sup>12</sup> The age range varies widely, from 5 to 57 years.<sup>11</sup> In the present case report, the dentigerous cyst was associated with the permanent maxillary canine in a 30 year-old male patient. These cysts can grow to very large size and can cause displacement of teeth, or in few cases it may remain relatively small. 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 investigation of asymptomatic slowly-growing swellings.<sup>12</sup>

In the present case, the dentigerous cyst typically appears as a well-circumscribed, unilocular, radiolucency around the crown of an impacted tooth.<sup>13</sup> An important diagnostic point is that this cyst was attached at the cemento-enamel junction. The internal aspect of the cyst is completely radiolucent except for the crown of the involved tooth. 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 central variety of dentigerous cyst as the radiolucency was seen clearly attached to the cement-enamel junction.

Water's view, panoramic radiography, intra oral radiographs and plain skull radiography are simple and inexpensive methods, which can be used for initial radiographic work-up of the patients with odontogenic lesions in daily practice.<sup>13</sup> However, two-dimensional radiographic images, are difficult to interpret because of the overlapping of complex osseous structure. Specialized imaging modalities like computed tomography (CT) and cone beam CT (CBCT) are of great importance in the management of these odontogenic cysts as they

determine the extension and features of the lesion prior to surgery.<sup>14</sup>



**Fig.5:** Hematoxylin and eosin stained 10X sections showing cystic lining with stratified squamous epithelium of varying thickness. Numerous rete peg formation and area of basilar hyperplasia were present. Evidence for keratinising superficial cells was present throughout the length of epithelium. Perivascular aggregate of chronic inflammatory cells infiltrate was seen.

In our patient, the CBCT images revealed that well defined radiolucent lesion associated with impacted 13. The thickened soft tissue lining seen along the sclerotic border was attributed to inflammation, but in the case of large long-standing lesions, it could also indicate malignant change. Volumetric rendering of the CBCT images permits better understanding of localization, cortical destruction, and association with surrounding anatomic structures.<sup>15,16</sup> CBCT has significant advantages over multidetector computational tomography or medical CT: (a) there is significantly less radiation exposure to the patient with CBCT; (b) CBCT uses a single rotation of the scanner around the fulcrum to capture images; (c) the patient can be seated during the scanning procedure; and (d) the scanner is small enough - similar to the OPG machine - to be placed in a dental hospital or core dental facility. The main disadvantage of the CBCT images - apart from the problem of artifacts generated from the cone-beam effect, scanner artifact, patient movement, or undersampling - is the relatively poor tissue contrast, which makes identification of small calcified structures difficult.<sup>17</sup> There is an increasing demand for three-dimensional imaging in dentistry. The current case report describes the significant contribution of CBCT in the planning and successful surgical management of dentigerous cysts and associated impacted teeth.

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