



## Dentigerous Cyst in the Anterior Region of the Mandible in a Patient with Multiple Impacted Teeth: A Case Report

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### ABSTRACT

Odontogenic cysts are subclassified as developmental or inflammatory in origin. The dentigerous cyst is the most common type of developmental odontogenic cyst, making up about 20% of all epithelium-lined cysts of the jaws. The pathogenesis of this cyst is uncertain, but apparently, it develops by fluid accumulation between the reduced enamel epithelium and the tooth crown. Although dentigerous cysts may be encountered in patients across a wide age range, they are discovered most frequently in patients between 10 and 30 years of age. Dentigerous cysts can grow considerably, and large cysts may be associated with a painless expansion of the bone in the involved area. We present a challenging case of dentigerous cyst in a 21-year-old female involving the anterior of the mandible, which was successfully treated surgically by enucleation of total cyst and surgical extraction of unerupted tooth under general anesthesia.

**Keywords:** Dentigerous cyst; Impacted teeth; Odontogenic cysts; Supernumerary tooth.

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## Introduction

The dentigerous or follicular cyst develops from the proliferation of the reduced enamel epithelium. Consequently, the cyst is associated with the crown of an unerupted tooth or supernumerary tooth. Dentigerous cysts are the second most common type of cyst in the jaws. Clinical examination may reveal a missing tooth or teeth and possibly a hard swelling that can manifest as facial asymmetry [1]. The pathogenesis of this cyst is uncertain, but apparently, it develops by the accumulation of fluid between the reduced enamel epithelium and the tooth crown. Although most dentigerous cysts are considered to be developmental in origin, some examples appear to have an inflammatory pathogenesis. For example, it has been suggested that, on occasion, a dentigerous cyst may develop around the crown of an unerupted permanent tooth as a result of periapical inflammation from an overlying primary tooth [2].

They are generally more prevalent in the mandibular molar and ramus region with high propensity to occur in close relation to impacted third molars [3]. But Dentigerous cysts have also been known to occur with almost similar frequency in association with maxillary canines followed by maxillary third molars and a few rare incidences associated with maxillary incisors [4]. The radiographic distinction between a small dentigerous cyst and an enlarged follicle about the crown of an unerupted tooth is difficult and may be largely an academic exercise. For the lesion to be considered a dentigerous cyst, some investigators believe that the radiolucent space surrounding the tooth crown should be at least 3–4mm in diameter. Radiographic findings are not diagnostic for a dentigerous cyst, however, because OKCs, unilocular ameloblastomas, and many other odontogenic and nonodontogenic tumors may have radiographic features that are essentially identical to those of a dentigerous cyst [2].

## Case Report

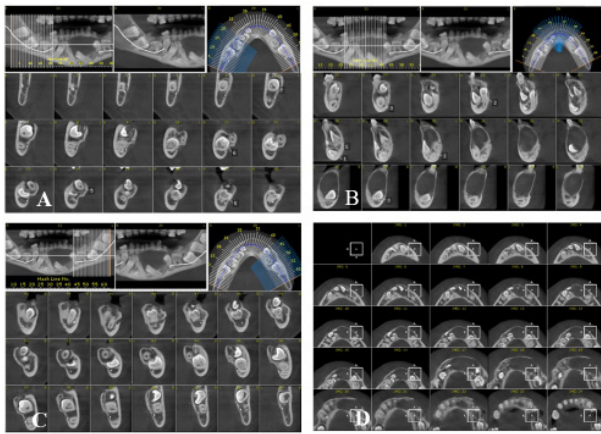
A 21-year-old female patient who had been referred to the Oral Medicine department of Hamedan Dental School for the treatment of misaligned teeth was accidentally seen in the panoramic image of a completely radiolucent lesion with well-defined and corticated periphery in the anterior of the mandible (Figure 1). The medical history of the patient did not reveal any specific systematic diseases or previous traumatic injuries in the affected area. The extraoral and intraoral examinations seemed to show no abnormalities and the pa-

tient was asymptomatic, with no pain or swelling and the lesion was discovered in panoramic radiography. The patient's family history showed that her brother also had several impacted teeth. To confirm the lesion limits, a cone-beam computed tomography (CBCT) was requested. The axial and cross-sectional views of the CBCT revealed a well-demarcated unilocular, hypodense, homogeneous and extensive lesion in the pericoronal area of the left canine of the mandibular anterior region which caused slight expansion, thinning and erosion of the buccal cortical plate. Destruction and perforation of the buccal cortical plate were also seen in some areas. The lesion has caused the apical displacement of the permanent teeth as well as root resorption of the primary teeth in this area of the lower jaw (Figure 2).

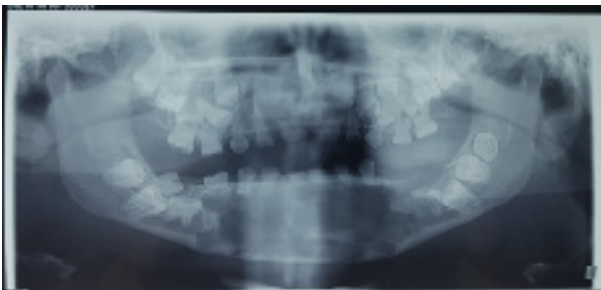
A biopsy of the lesion was performed, and microscopic observation of serial sections preparation revealed ulcerative membranous tissue with stratified squamous epithelium lining. In thick fibroconnective stroma, dense infiltration of chronic inflammatory cells, including lymphocytes and plasma cells and neutrophils with many Rushton bodies, are noted aggregates of foamy macrophages, cholesterol crystals, and multinucleated giant cells are not obvious. The histopathological report revealed an irritated dentigerous cyst. Under general anesthesia, the cystic tissue was exposed, and a complete enucleating of the cysts was performed with the removal of the Unerupted teeth. (Figure 3).



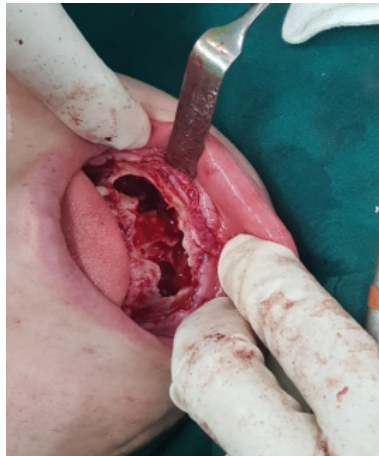
Figure 1. Preoperative panoramic radiograph.



**Figure 2.** CBCT scan. (A-C) Cross-sectional sections and (D) axial sections showing hypodense corticated area with multiple impacted teeth.



**Figure 3.** Postoperative panoramic radiograph.



**Figure 4.** Intra-operative view.

### Discussion

Dentigerous cysts are the most common type of developmental odontogenic cyst and are the second most common cystic lesion of the jaw, after radicular cyst [5]. These cysts are more common in the second and third decades of life [6]. About 70% of the cysts occur in the posterior mandible and 30 % in the maxilla. It usually involves the third molars [5]. In our case, the cyst was found in the anterior part of the mandible and in the peri-coronal of the left canine tooth, which in-

cludes multiple impacted teeth, which is opposite to its most common location. DC are known to be asymptomatic which gradually grows over time and are generally presented only when it attains sizes big enough to cause gross intraoral swelling or teeth displacements and facial asymmetries while others are found incidentally during routine radiographic examinations [5]. In our case, the patient came without any clinical symptoms and only for the treatment of misaligned teeth. The exact histopathogenesis of the dentigerous cyst is not known. It is stated that the dentigerous cyst develops around the crown of an unerupted tooth by accumulation of fluid either between the reduced enamel epithelium and enamel or in between the layers of the enamel organ. This fluid accumulation occurs as a result of the pressure exerted by an erupting tooth on an impacted follicle, which obstructs the venous outflow and thereby induces rapid transudation of serum across the capillary wall. Ben and Altini showed that at least two types of dentigerous cysts occur. The first type is developmental in origin and occurs in mature teeth usually as a result of impaction. The second type is inflammatory in origin and occurs in immature teeth as a result of inflammation from a non-vital deciduous tooth or some other source spreading to involve the tooth follicle [7].

In our case, the cyst was probably of developmental origin. Various radiographic methods that are used to evaluate dentigerous cysts include: Water's (for maxillary cysts), panoramic, and skull radiography are simple and inexpensive methods that can be used in daily practice. The structure of a tooth can be detected on panoramic radiographs. Therefore, panoramic radiographs are preferred over CT. Although the structure of a tooth can be detected on panoramic radiographs, they are inadequate for localizing mandibular impacted teeth due to their inherently less sharp image and ghost image. A CT scan provides superior bony detail, allowing for visualization of the size and extent of the lesion with determination of inferior alveolar nerve canal (IANC) invasion or involvement. Therefore, CT may be more valuable than plain film radiographs, not only for definitive diagnosis but also for evaluation of the associated pathology, exact localization of the impacted tooth, and proper treatment planning [7]. In our case, Cone Beam Computed Tomography (CBCT) which has a lower cost and lower radiation dose than conventional CT, was used for localization of multiple impacted teeth and knowing the extension of the lesion. In this unique case report, the cyst was found to be enclosing eight permanent mandibular teeth:

Central incisors, lateral incisors, and canines and first premolars on both the right and left sides. Due to the slow and regular development, this cyst appears radiographically as a radiolucent symmetrical, unilocular, well-defined, cortical mass that surrounds the crown of an unerupted or impacted tooth [7]. In the event of infection, the dentigerous cyst may become symptomatic and have ill-defined margins on radiographs [6]. This cyst's radiographic appearance must be recognized from the typical appearance of the circum-coronal follicular area around the erupting tooth [6]. An important diagnostic point is that this cyst attaches to the cemento-enamel junction [7]. In some circumstances, a radiolucent region may appear lateral to the crown of the tooth, especially if the cyst is quite big in size or if the tooth's location has changed from its original position. A pericoronal space of 2.5mm or greater might be regarded as the minimal distance for a probable pre-cystic lesion to be diagnosed. A dental follicle and a tiny dentigerous cyst are not distinguishable, but a radiolucent appearance of 3-4mm or more suggests the establishment of a cyst [6]. One of the most difficult conditions to distinguish in the differential diagnosis is hyperplastic follicle [5].

Other conditions that must be excluded from the diagnosis are OKCs, unilocular ameloblastomas, and many other odontogenic and nonodontogenic tumors [2]. Unlike other odontogenic cysts, the epithelial cells lining the lumen of the dentigerous cyst possess an unusual ability to undergo metaplastic transition. Occasionally, some untreated dentigerous cysts can develop into an odontogenic tumor (e.g., ameloblastoma) or a malignancy (e.g., oral squamous cell carcinoma) [7]. The dentigerous cyst presses and resorbs the neighboring teeth. In our case, the cyst starts in the left mandibular canine, but it spreads to neighboring teeth because it grows large enough and extends into medullary bone of the anterior mandible [6]. Management of multiple impacted teeth associated with dentigerous cysts involves a complex multidisciplinary approach. Age of the patient, position of the teeth and number of impacted teeth associated with dentigerous cysts and any concomitant metabolic, genetic and syndromic abnormalities have to be considered during the treatment planning. Following complete removal, dentigerous cysts are known to recur very rarely. This is related to the exhausted nature of the reduced enamel epithelium, which has differentiated and formed tooth crown enamel before becoming a cyst [8]. Marsupialization and surgical enucleation of the cyst may be the treatment of choice [7]. The Standard Treatment for

DC is enucleation and extraction of the cyst-associated impacted or unerupted teeth. However, marsupialization is advisable in larger cysts and is thought to be more efficient in children as it conserves the affected tooth and facilitates its eruption [5]. In the present case, surgical enucleation of the cyst was done and the teeth involved were extracted along with complete cystic enucleation. As the histopathologic appearance of the lining epithelium is not specific, the diagnosis relies on the radiographic and surgical observation of the attachment of the cyst to the cemento-enamel junction. The patient has been followed up for the past 4 months with no evidence of recurrence till now.

## Conclusion

This case describes the presentation of the dentigerous cyst associated with multiple impacted teeth in the anterior region of the mandible, which is a rare case in the literature and we intend to add valuable information to those previously reported cases by presenting this particular case. Eventually, due to the high incidence of this cyst in association with an impacted or unerupted tooth, it is important to perform a radiographic-clinical examination of all impacted or unerupted teeth.

## Conflict of Interest

There is no conflict of interest to declare.

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