

## Solitary Dentigerous Cyst – A Revisit

Dr. Vijaya Nirmala Subramani<sup>1</sup>, Dr. T. Muthukumar<sup>2</sup>, Dr. N. Malathi<sup>3</sup>

1(Department of Oral Pathology and Microbiology, Faculty of Dental Sciences, SRIHER, INDIA)

2(Department of Anatomy, Sri Ramachandra medical & hospital, SRIHER, INDIA)

3(Department of Oral Pathology and Microbiology, Faculty of Dental Sciences, SRIHER, INDIA)

---

**Abstract:** Solitary dentigerous cysts are the second most prevalent odontogenic cyst, frequently asymptomatic and found by a routine radiography of missing tooth from the dental arch. Clinical diagnosis requires correlation with radiographic findings. The inflammatory cysts of deciduous dentition should be differentiated from the dentigerous cysts of corresponding unerupted permanent dentition. The final diagnosis can only be confirmed histopathologically, although diagnostic challenge between inflammatory origin dentigerous cyst and inflammatory odontogenic of oral cavity. The treatment of choice is enucleation and removal of the associated tooth with excellent prognosis. The review enlists the earliest and recent pathogenesis, Clinicopathological features, different diagnosis and enabling a holistic approach in treatment modalities for mixed & permanent dentition.

**Keywords:** Osteolytic lesion, inflammatory origin, Transitional dentition and Marsupialization

---

Date of Submission: 10-04-2020

Date of Acceptance: 24-04-2020

---

### I. Introduction

Odontogenic cysts are one of the true cyst, occur banal in the oral and maxillofacial region. These cysts arise from the immature odontogenic epithelium, capable of producing dental structures. Cystic degeneration may occur late stages of amelogenesis or after amelogenesis ceases. Epithelial lined odontogenic cysts develop either in result of periodontal inflammation or in result of developmental disturbance in the course of the odontogenesis<sup>1</sup>. “The World Health Organization (1992) Odontogenic cysts classified as developmental type or inflammatory type based on origin. Developmental odontogenic cysts encompass dentigerous cyst, lateral periodontal cyst, keratocyst, sialoodontogenic cyst, and eruption and gingival cysts”. The inflammatory type includes radicular, residual and paradental cysts. The developmental odontogenic cysts arise not often in the jaw bones as compared to inflammatory cysts<sup>2</sup>. In 1985, Shear stated that epithelial odontogenic cysts share many clinical and radiological similarities. Histopathological examination should be essential for all the surgically removed tissue. Fewer aggressive cysts may tend to recur, for appropriate treatment plan will often ensure by early and accurate diagnosis<sup>3</sup>.

Dentigerous Cysts (DC) has developmental odontogenic epithelial origin and is the most frequent type (10%) among the odontogenic cyst. Dentigerous cyst contributes 20-24% of all epithelial lined jaw cyst. “Dentigerous cyst can be defined as an odontogenic cyst that surrounds the crown of an impacted tooth; caused by fluid accumulation between the reduced enamel epithelium and the enamel surface, resulting in a cyst in which the crown is located within the lumen”. It is also known as follicular cyst. The term follicular cyst is a misnomer which usually refers to hair follicle cyst or follicular cyst of ovary. The most appropriate term Dentigerous (tooth bearing) cyst was stressed by Browne & Smith in 1991. The first case report of dentigerous cyst was published in 1842 by Harris C.A.<sup>[4]</sup>

### Development origin

The most accepted pathogenesis of the dentigerous cysts was fluid accumulation separates one or both layers of the enamel epithelium from the crown of an unerupted tooth. The impacted tooth exerts pressure on the follicle that obstructs the venous outflow and induces rapid transudation of serum across the capillary walls. Expansion of cyst is caused by increase in osmolality or internal hydrostatic pressure of the cystic fluid<sup>5</sup>.

**Inflammation origin:** Studies propose that dentigerous cyst not only developmental origin, but also have inflammatory in nature. The epithelial rest cells propagate through cytokine synthesis triggered by unknown stimuli. Inflammation of non-vital teeth or periapical infection caused by bacterial endotoxins. Endotoxins stimulate cytokines ie interleukin-1,6 transforming growth factor-beta, tumor necrosis factor, platelet-derived growth factor & also mitogens for epithelial cells. The cyst wall developed from proliferative epithelial strands which serve as building blocks. Dentigerous cyst walls show acute and chronic inflammation, inflammatory exudation cause the cyst to expand. It enlarges by unicentric expansion from the hydrostatic pressure of its contents<sup>6,7</sup>. Anderson’s study concluded that histologically the effect of inflammation on

odontogenesis of permanent dentition. Type of disturbance in successor permanent tooth depends predominantly on the time of onset of periapical infection, virulence of the invading bacteria and the host immune status<sup>8</sup>. There is an association between persistent, prolonged inflammation of a primary tooth and the development of an inflammatory dentigerous cyst involving the succedaneous tooth<sup>9</sup>.

### Clinical Presentation

Odontogenic cysts have geographic differences with regard to the demographical data. Dentigerous cysts are usually occurs in 2<sup>nd</sup> & 3<sup>rd</sup> decades of life with male predilection (3:2 ratio-M: F) in permanent dentition. Mandibular 3<sup>rd</sup> molar and maxillary permanent canine are the common site of occurrence followed by mandibular premolar and maxillary 3<sup>rd</sup> molar. In the literature reviewed, rare occurrence of these cyst associated with the primary tooth shown in Table1<sup>10,11,12,13,14,15</sup> and maxillary sinus also seen<sup>16</sup>.

**Table 1** Shown solitary dentigerous cyst occurs in various age, site

Author	Year	Age /Sex	Involving the primary teeth
Delbem ACB et al <sup>10</sup>	2006	10yrs/M 8yrs/M	Mandibular left second molar Mandibular Right lateral incisor
Kirtaniya BC et al <sup>11</sup>	2010	7yrs/M 10yrs/F	Mandibular left canine, first and second molars Mandibular Right lateral incisor ,canine and first molar
Singh S et al <sup>12</sup>	2014	13yrs/M	Mandibular left second molar
Manekar VS et al <sup>13</sup>	2014	9yrs/F 9yrs/M	Mandibular left First molar Maxillary Right Second molar
Demiriz L et al <sup>14</sup>	2015	5yrs/F	Mandibular Right First molar Region
Sandhyarani B et al <sup>15</sup>	2016	11yrs/F	Mandibular Right Second molar

Cases have been reported associated with supernumerary teeth in premaxillary region<sup>17,18</sup>. It usually has a unilateral presentation, but bilateral and multiple dentigerous cyst have also been reported. The second most common odontogenic cyst are Solitary / Unilateral dentigerous cysts. Bilateral cyst is commonly associated with a developmental syndromes and systemic diseases i.e cleidocranial dysplasia<sup>6,17</sup>. In the absence of a syndrome associated bilateral dentigerous cysts in mandible were also reported<sup>19-22</sup>. Jeon *et al* reported dentigerous cyst in all four quadrants<sup>23</sup>. The expansion of cyst results to clinical facial asymmetry, displacement of tooth, resorption of adjacent teeth root and failure in teeth eruption. The resorption of cementum and dentine of adjacent teeth play a vital role of PGE2 and PGE3, released from the dental follicle. Pain is a symptomatic feature in case of an infected cyst<sup>18</sup>. The pathological fracture of jaw bones occurs due to rapid expansion of dentigerous cyst<sup>24</sup>. In the literature also mentioned, inflammatory disturbance of cyst varies from common findings such as Turners hypoplasia, enamel hypomineralization, pigmentation, dilacerations of crown/root, ghost teeth, premature eruption and crater like bone loss. It may also lead to discrepancies such as temporary arrest of root/tooth development, delayed eruption of successional permanent teeth and even dentigerous cyst formation in the permanent tooth. These developmental origin is more common in second & third decades, inflammatory dentigerous cysts occurs in the first and early part of the second decades of life<sup>25</sup>.

**Imaging features:** In mixed dentition, radiolucency present periapical region of deciduous tooth & pericoronal radiolucency associated with the permanent tooth diagnostic challenge. Seward reported that radiologically lesions more than 5cm in diameter. It is usually diagnosed incidentally by radiographs in which it characterized well-defined with sclerotic margins, unilocular radiolucency around the crown of unerupted teeth. Radiologically, it is of three types-Central, Lateral, Circumferential<sup>26</sup>. Radiological imaging ie OPGs, CT and MRI helps to distinguish dentigerous cysts from other cystic lesions of the jaws. The key diagnostic feature of dentigerous cyst is enveloping the crown of unerupted tooth /the crown intrudes into lumen macroscopically. It can confirmed either by FNAC -Cystic lumen containing cystic fluid which is thin, watery, or blood tinged and also biopsy- Lining epithelium is made of 2-3 layers of flattened cells devoid of rete ridges and dental follicle forms the connective tissue consist of young fibroblast and mucopolysaccharides ground substance. Odontogenic epithelial remnants may be seen in the connective tissue. Mucous metaplasia, mural thickenings or nodules can also frequently seen<sup>27</sup>. Occasionally sebaceous cells may be found on the epithelial lining. Dentigerous cyst with sebaceous gland differentiation- five cases were reported by Chi *et al*<sup>28</sup>.

### Differential diagnosis

The most difficult differential diagnosis is between hyperplastic dental follicle and a small dentigerous cyst. The size of the Pericoronal radiolucency can be helpful in distinguishing between the two and if the diameter of the radiolucency is more than 5 mm, a dentigerous cyst is more likely. Radiologically, Radicular cyst arising from primary teeth mimics a dentigerous cyst of the permanent successor. The growth potential,

differentiation and degeneration of dentigerous cyst are more comparing to a radicular cyst. The histopathological features of non infected dentigerous cyst are similar to that of odontogenic fibroma, odontogenic myxoma owing to the fact that all three lesions are derived from tooth-forming epithelial residues. Infected dentigerous cyst exhibits anastomosing rete ridges mimicking radicular cysts. Radiographically, the infected cyst appears ill-defined margins. Epithelial cell-proliferation assay indicated that significantly higher concentrations of endotoxin and the cytokines had a mitogenic effect on epithelia of radicular cyst<sup>26, 27</sup>.

### Potential Complications

The disposition for neoplastic epithelial proliferation is high marked in the dentigerous cyst. A case report of ameloblastoma<sup>29,30</sup>, Adenomatoid odontogenic tumor<sup>31</sup> and complex odontomas arises from the wall of a dentigerous cyst<sup>32</sup>. Transformation to intraosseous mucoepidermoid Carcinoma and epidermoid carcinoma have also been reported by Agnieszka et al<sup>33</sup> and Matsuzaki et al<sup>34</sup>.

### Treatment

Dentigerous cysts are treated by enucleation in case of the smaller cysts. However, extensive lesions are treated with cyst enucleation and extraction of the associated teeth<sup>35</sup>. The enucleation may be damaged tooth germs and teeth may lose its vitality in case of mixed dentition. In young patients, the treatment of options recommended is Cyst enucleation without extraction and decompression in order to preserve the involved dentition<sup>36</sup>. Marsupialization and decompression are the conservative treatment of choice in the mixed dentition<sup>35-37</sup>. Irla Karlinne et al reported a case of conservative treatment of dentigerous cyst that contributed to spontaneous eruption of premolars in a 10 year old patient<sup>38</sup>. A case of spontaneous regression of bilateral dentigerous cyst was reported in association with impacted third molars<sup>39</sup>. Noriaki Aoki et al emphasized the success of a multidisciplinary approach to managing a dentigerous cyst and stimulating new bone formation in the surgical field after Marsupialization<sup>40</sup>. Recurrence is uncommon if excision is done completely. In case of recurrence or malignant transformation Hemi Mandibulectomy is the treatment of choice<sup>41</sup>.

## II. Conclusion

An attempt has been made in this article highlighted the subtle differences seen microscopically between these two lesions especially mixed dentition and also various treatment options have been proposed for the management of these cyst.

## Reference

- [1]. Rajendran R. Shafer's textbook of oral pathology. Sixth editors. New Delhi: Elsevier, 2012:254.
- [2]. Douglas R Gnepp. Diagnostic surgical pathology of head and neck. Second edition. New Delhi: Elsevier, 2009: pg 252-54.
- [3]. Brad W Neville, Damir, Allen & Bouquet .Oral and Maxillofacial Pathology. Third edition.india:Elsevier;2009.ch11:pg477-79
- [4]. Robert E Marx & Diane stern. A Rationale for Diagnosis and Treatment: Quintessence publication;2003
- [5]. Shear M, Speight P. Cyst of the oral and maxillofacial region. 4th edition, Blackwell Munksgaard Publication; Pp.1
- [6]. Main DM. The enlargement of epithelial jaw cysts. Odontol Revy. 1970; 21:29-4.
- [7]. .NagaveniNB,Umashankara KV,Radhika NB. Inflammatory dentigerous cyst associated with an Endodontically treated primary second molar: A case report.Arch.Orofac Sci.2011;6:27-31.
- [8]. Andreasen JO, Ralis I. Influence of pulp necrosis and periapical inflammation of primary teeth on their permanent successors. Combined macroscopic and histologic study in monkeys. Int J Oral Surg 1978;7:178-87
- [9]. Shetty RM and Dixit U.Dentigerous cyst of inflammatory origin. IJCPD. 2010; 3(3):195-98
- [10]. DelbemACB,CunhaRF,AfonsoRL,BiancoKG and IdemAP. Dentigerous cyst in primary Dentition: Report of 2 cases.pediatric dentistry.2006;28(3):269-72.
- [11]. Kritaniya BC,Sachdev V,Singla A and Sharma Ak . Marsupialization: A conservative approach for treating dentigerous cyst in children in the mixed dentition.Jisppd.,Jul-Sept2010;28(3)203-08
- [12]. Singh S,Kaur K,Kochhar GK and Gupta A.Marsupialisation:a treatment modality of a dentigerous cyst.BMJ case Rep 2014.205150
- [13]. Manekar VS,Chavan A,Wadde K and Dewalar V. Cyst in Periradicular region of deciduous molar in mixed dentition:retrospective study of five cases.IJCPD 2014;7(3):229-235
- [14]. Demiriz L, Misir AF, Gorur DI. Dentigerous cyst in a young child. Eur J Dent 2015; 9:599-602.
- [15]. Sandhyarani B,Noorani H, Shivaprakash PK and Dayanand AH. Fate of pulpectomized deciduous teeth: Bilateral odontogenic cyst?.Contemp Clin Dent.2016;7(2):243-45.
- [16]. Girish G,Mahesh Kumar R,Umashankar DN,rashi Sharma,veeresh M and Ambika Bhandari.Dentigerous cyst in Maxillary Sinus :A Rare Occurrence.IJOMFP 2011:2(2)20-23
- [17]. Jiang Q, Xu GZ, Yang C, Yu CQ, He DM, Zhang ZY. Dentigerous cysts associated with impacted supernumerary teeth in the anterior maxilla. Experimental and Therapeutic Medicine. 2011; 2: 805-809.
- [18]. Pereira T, Shetty S, Date A. Infected dentigerous cyst associated with a horizontal impacted ectopic supernumerary tooth induced by trauma to the maxillary incisors: A rare case report. J Med Sci 2018;38:127-30.
- [19]. Cury SE, Cury MD, Cury SE, et al. Bilateral dentigerous cyst in a nonsyndromic patient: case report and literature review. J Dent Child (Chic) 2009; 76:92-6.
- [20]. Vasiappan H, Christopher P J, Kengasubbiah S, et al. Bilateral Dentigerous Cyst in Impacted Mandibular Third Molars: A Case Report. Cureus 2018;10(12): e3691.
- [21]. Khandeparker RV , Khandeparker PV, Virginkar A and Savant K . Bilateral Maxillary Dentigerous Cysts in a Nonsyndromic Child: A Rare Presentation and Review of the Literature. Case Reports in Dentistry Volume 2018, Article ID 7583082, 6 pages

- [22]. Pant B, Carvalho K, Dhupar A, Spadigam A. Bilateral nonsyndromic dentigerous cyst in a 10-year-old child: A case report and literature review. *Int J App Basic Med Res* 2019;9:58-61.
- [23]. Jae-Yun Jeon, Chang-Joo Park, Seok Hyun Cho, Kyung-Gyun Hwang. Bilateral dentigerous cysts that involve all four dental quadrants (*J Korean Assoc Oral Maxillofac Surg* 2016; 42:123-126).
- [24]. Kouhsoltani M, Mesgarzadeh AH and Khiavi MM. Mandibular Fracture Associated with a Dentigerous Cyst: Report of a Case and Literature Review. *JODDD* 2015;9(3):193-98.
- [25]. Regezi, Sciubba and Jordan. *Clinical Pathologic Correlations*. Sixth Edition. India: Elsevier; 2012
- [26]. Seward MH. Eruption cyst: an analysis of its clinical features. *J oral surg* 1973 Jan;31(1):31-5
- [27]. E.W. Odell and P.R. Morgan. *Biopsy Pathology of the Oral Tissues* 1<sup>st</sup> edition. London: CRCpress; 1998
- [28]. Chi AC, Neville BW, McDonald TA, Trayham RT, Byram J, Peacock EH. Jaw cysts with sebaceous differentiation: report of 5 cases and a review of the literature. *J Oral Maxillofac Surg* 2007; 65: 2568-2574.
- [29]. NVV Satya Bhushan, Naga Malleswar Rao, M. Navatha, B. Kirankumar. Ameloblastoma arising from a dentigerous cyst - A case report. *Journal of Clinical and Diagnostic Research*. 2014 May, Vol-8(5): ZD23-ZD25.
- [30]. Kondamari SK, Taneeru S, Guttikonda VR, Masabattula GK. Ameloblastoma arising in the wall of dentigerous cyst: Report of a rare entity. *J Oral Maxillofac Pathol* 2018;22 suppl S1:7-10
- [31]. Manjunathana BS, Mahajan A, Mody BM and Shah V. Adenomatoid Odontogenic Tumor Arising from a dentigerous cyst: Literature Review and Report of a Case. *J maxillofac. oral Surg* 2015;14(2):393-397.
- [32]. Dagrus K, Purohit S and Manjunatha BS. Dentigerous cyst arising from a complex odontomas: An unusual presentation. *BMJ Case Rep* 2016;214936
- [33]. Agnieszka Zapala-Pośpiech, Grażyna Wyszynska-Pawelec, Dariusz Adamek, Romana Tomaszewska, Małgorzata Zaleska, Jan Zapala. Malignant transformation in the course of a dentigerous cyst: a problem for a clinician and a pathologist. Considerations based on a case report. *Pol J Pathol* 2013; 1: 64-68
- [34]. Matsuzaki H, Karase N, Matsumura T, et al. Solid-type intraosseous squamous cell carcinoma of the mandible: a case report with histopathological and imaging features. *Oral Maxillofac Radiol* 2012;114:71-77.
- [35]. Alkhatib A, Manton D J. Preservation of teeth involved with an odontogenic cyst. *European Archives of Paediatric Dentistry* June 2010; 11(3): pp 146-148
- [36]. Deboni MC, Brozoski MA, Traina AA, Acay RR, Naclério-Homem MG. Surgical management of dentigerous cyst and keratocystic odontogenic tumor in children: a conservative approach and 7-year follow-up. *J Appl Oral Sci*. 2012; 20:282-5
- [37]. Anjana G, Verma B and Ushus P. Management of a Dentigerous cyst: A Two year Review. *IJCPD* 2011;4(2):147-151.
- [38]. Ghandour L, Bahmad HF and Assi SB. Conservative Treatment of Dentigerous cyst by Marsupialization in a young female patient – A case Report & Review of the literature. *Case Reports in Dentistry* Volume 2018, Article ID 7621363, 6 pages
- [39]. Carvalho IKFD and Luna AHB. Spontaneous Eruption of Premolar Associated with a Dentigerous Cyst. *Case Reports in Dentistry* Volume 2016, Article ID 5323978, 5 pages
- [40]. Aoki N, Ise K, Inoue A, Kosugi Y, Koyama C et al. Multidisciplinary approach for treatment of a dentigerous cyst – Marsupialization, orthodontic treatment, and implant placement: a case report. *J Med Case Reports* 12, 305 (2018).
- [41]. Garg Ramneesh, Shah Sheerin, Kaur Sundeep, Garg Bhavna. Early Recurrence of dentigerous cyst - A case report. *Sch J Med Case Rep*, February 2016; 4(2):73-76.

Dr. Vijaya Nirmala Subramani, et al. "Solitary Dentigerous Cyst – A Revisit." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 19(4), 2020, pp. 04-07.