

Dentigerous cyst in a young child: a case report

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ABSTRACT

Dentigerous cysts are one of the most common developmental types of odontogenic cysts occurring in the oral cavity and often manifest as incidental findings on dental radiographs and/or as asymptomatic swellings. These cysts develop from remnants of reduced enamel epithelium around the crown of an unerupted or impacted tooth, attached at the level of the cemento-enamel junction. Most are considered developmental. However, in young clients they may be inflammatory in origin, the result of caries in the primary dentition. This short communication highlights a case of an asymptomatic dentigerous cyst identified in a 4-year-old child and subsequent enucleation under general anesthesia. A thorough clinical and radiographic assessment of the oral cavity in pediatric clients merits a review of dentigerous cysts by the dental hygienist.

RÉSUMÉ

Les kystes dentigères sont parmi les types développementaux de kystes odontogènes les plus courants qui apparaissent dans la cavité buccale et se manifestent souvent comme des découvertes imprévues sur les radiographies dentaires ou comme des enflures asymptomatiques. Ces kystes se développent à partir de restes d'épithélium d'émail réduit autour de la couronne d'une dent incluse ou enclavée, attachés au niveau de la jonction cémento-émail. La plupart des kystes sont considérés comme développementaux. Cependant, chez les jeunes clients, ils peuvent être d'origine inflammatoire, la conséquence de caries dans la dentition primaire. Cette brève communication souligne un cas de kyste dentigère asymptomatique décelé chez un enfant de 4 ans et une énucléation subséquente sous anesthésie générale. Une évaluation clinique et radiographique approfondie de la cavité buccale des clients pédiatriques justifie que l'hygiéniste dentaire se renseigne sur les kystes dentigères.

Keywords: child, deciduous, dental caries, tooth, impacted; dentigerous cyst; dentition, mixed; odontogenic cysts; radiography, panoramic; tooth, unerupted

CDHA Research Agenda category: risk assessment and management

INTRODUCTION

Dental clients present with a variety of soft tissue and intraosseous pathologies noted by the dental hygienist during the assessment and treatment phases of the dental hygiene process of care. A thorough knowledge of these pathologies will be an invaluable asset when assisting the dentist in developing the diagnosis and treatment plan.

Dentigerous cysts (DCs) of the oral cavity are odontogenic cysts, attached to the cervical region of an unerupted tooth and enclosing the crown. Their exact etiology is unknown and may be referred to as a follicular cyst. Most are considered developmental, with a typical histology of a wall of loose fibrous tissue, lined by thin, regular epithelium, evolving from remnants of reduced enamel epithelium around the crown of an unerupted or impacted tooth. These remnants undergo cystic degeneration with fluid accumulation in the central portion of the lesion which is attached at the cemento-enamel junction.¹ The inflamed DC is characterized by the presence of hyperplastic epithelium with an inflammatory cellular infiltrate.² This type is believed to predominantly develop as a result of periapical inflammation from an overlying primary tooth, affecting the developing tooth follicle.²

DCs are the second most common odontogenic cyst (second only to the periapical cyst) making up approximately 20% of all epithelial lined cysts of the jaws. The highest incidence of DCs occurs during the second and third decades with a slight male predilection. Teeth most commonly affected are mandibular third molars, followed by maxillary canines and mandibular premolars.^{1,3,4}

DCs often manifest as incidental findings on dental radiographs and/or as asymptomatic swellings clinically.¹⁻⁴ The typical radiographic appearance is of a well-circumscribed, unilocular, symmetric radiolucency around the crown of an impacted tooth. However, the cyst-to-crown relationship may show varied radiographic appearance. The most common central variety appears with the cyst surrounding the crown of the tooth, the crown projecting into the cystic lumen, and the root(s) outside the cyst. In the lateral variety, the cyst appears to expand laterally along the root surface, partially surrounding the crown, as can be the case with a partially erupted mesioangular impacted mandibular third molar. The circumferential variety presents radiographically as the cyst surrounding the crown yet extending for

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some distance vertically along the root, appearing that a portion of the root is within the cystic lumen.^{5,6} Large DCs may appear multilocular, resulting in a radiographic appearance comparable to other pathologies.⁷ In the case of an inflammatory DC, radiographically the cystic lesion would most often be observed in relation to an overlying necrotic primary tooth.² To receive a true diagnosis, radiographic appearance along with an incisional biopsy are necessary to rule out other lesions that may require more aggressive treatments.³⁻⁶

CASE DESCRIPTION

A 4-year-old Caucasian male presented for a comprehensive oral evaluation and prophylaxis at a private pediatric dental office in the United States. His medical history was unremarkable, with no systemic problems and no

report of pain. Despite having private dental insurance, he had prior inconsistent dental care. Bitewing radiographs were obtained, and several carious lesions were noted, including a large multisurface lesion on the mandibular right primary second molar (85) and occlusal caries on the adjacent primary first molar (84) (Figure 1).

When the client returned for restorative treatment of 85 3 months later, a periapical image was obtained of that area (Figure 2). The pediatric dentist was unable to complete the treatment due to client sensitivity despite maximum allowable delivery of local anesthetic; a temporary filling was placed. The client returned 5 months later for treatment of 85 and another periapical radiograph was obtained (Figure 3), which revealed part of an adjacent radiolucency as well as resorption of a portion of the distal root. Due to this finding a panoramic image was also obtained. The

Figure 1. Initial bitewings show several carious lesions, specifically large DOB caries on #85

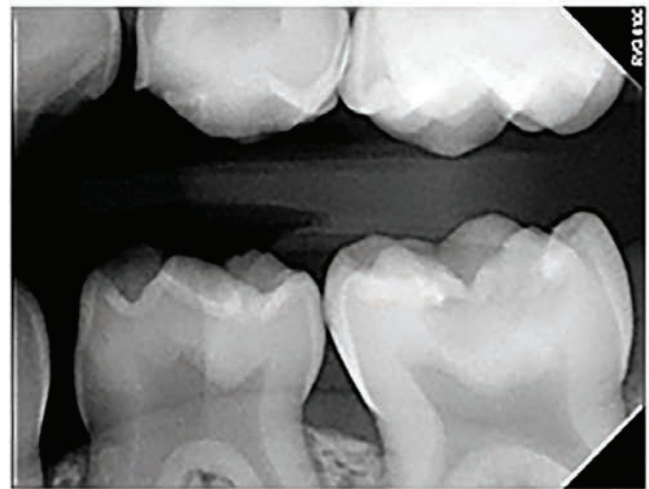
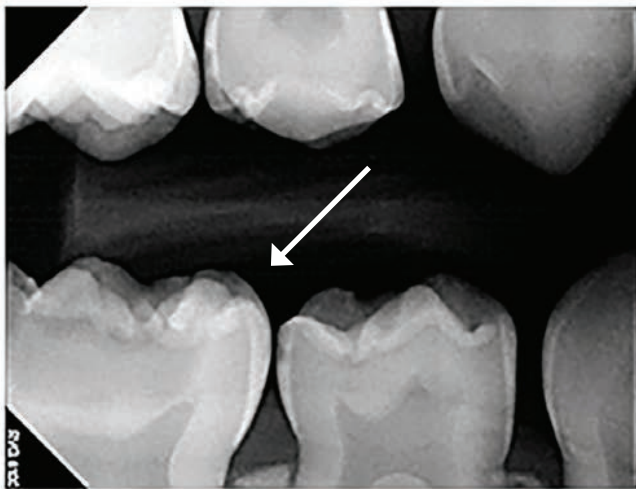


Figure 2. Periapical radiograph of primary right second molar prior to restoration

Figure 3. Periapical radiograph of primary right second molar prior to second attempt at restoration

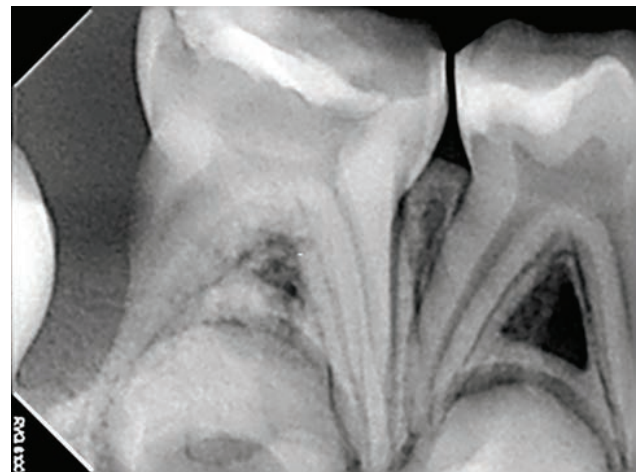
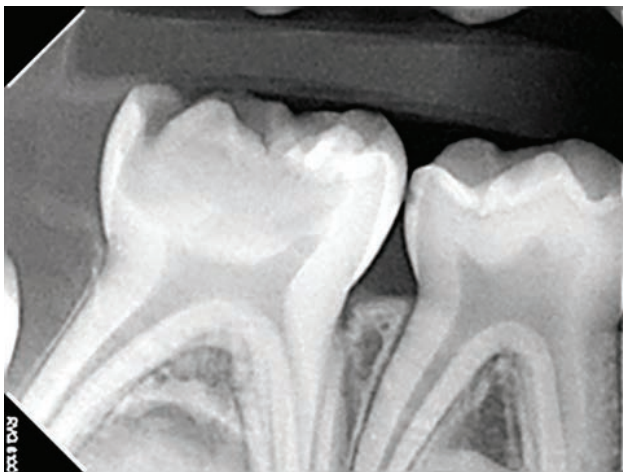
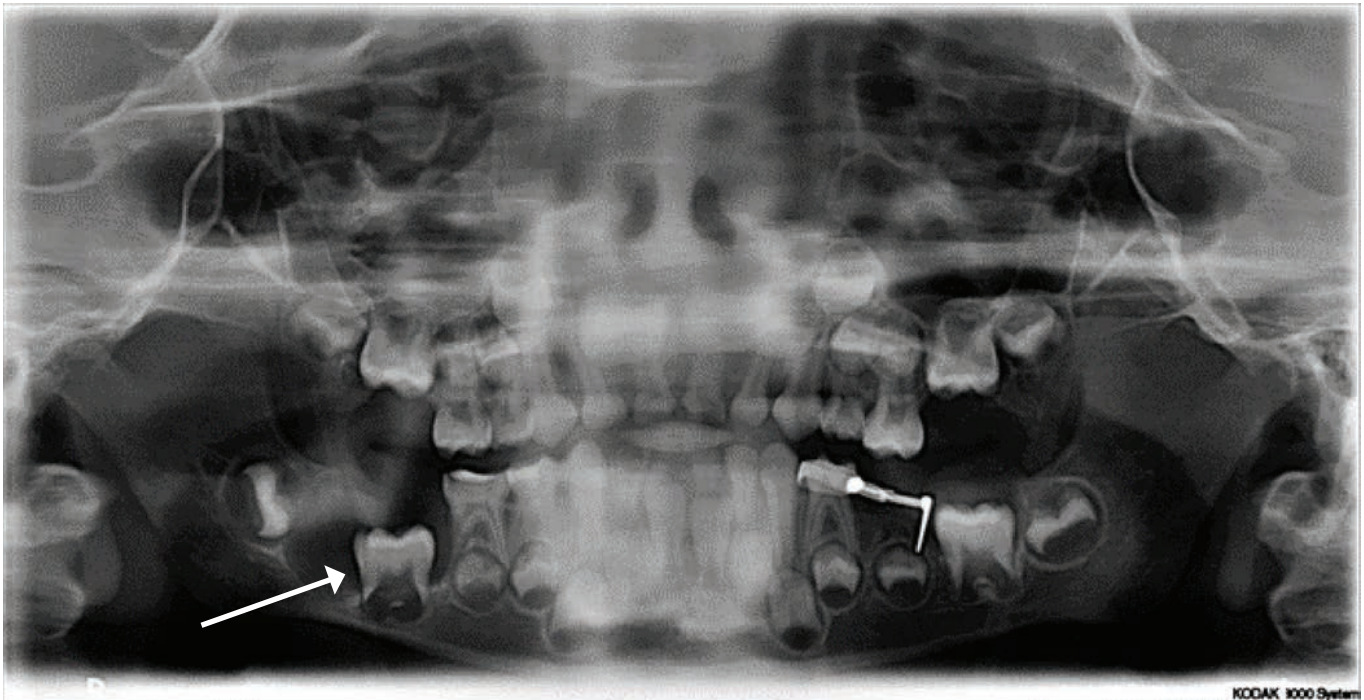


Figure 4. Panoramic image revealing a large radiolucent lesion associated with the crown of tooth #46



panoramic image revealed a large radiolucency associated with the crown of tooth 46 (Figure 4), tooth 47 was displaced posteriorly, and a missing maxillary right lateral incisor was also noted. Based on radiographic presentation the pediatric dentist made a differential diagnosis of lateral dentigerous cyst associated with the unerupted tooth 46. A referral was made to a local oral surgeon for the following day.

The oral surgeon elected to perform a punch biopsy, received a diagnosis of dentigerous cyst from the histopathologic report, and scheduled a surgery under general anesthesia to enucleate the cyst one month later.

During surgery, tooth 85 was extracted as well as a small amount of buccal bone. The lateral wall of the cyst was revealed and mobilized from the bony walls. Special care was taken to elevate the cyst and detach it from the cervical attachments of tooth 46, while at the same time holding the tooth in its normal position to prevent dislodgement as shown in Figure 5.

The cavity was curetted and irrigated thoroughly to remove remnants of the cyst lining. The flap was repositioned and secured with multiple interrupted gut sutures. The specimen was submitted for histopathologic evaluation which later confirmed the diagnosis of a dentigerous cyst. The pathology report did not include specific histology of the specimen. It simply stated the diagnosis as dentigerous cyst.

RESULTS

Follow-up exam appointments were rescheduled by the client's mother multiple times with the pediatric dental

office, making the follow-up exam 1 year and 5 months post-surgery. Clinically, normal healing of all soft tissue in the area of the cystic lesion was noted. A new panoramic radiograph revealed tooth 46 tipped distally and possible vertical impaction underneath 47 as seen in Figure 6. It was recommended that the client return 6 months later for a periapical radiograph to recheck the positioning of 46. If the position had not improved in 6 months, a referral would be made to the appropriate specialist.

Figure 5. Cyst detached from cervical attachment of #46

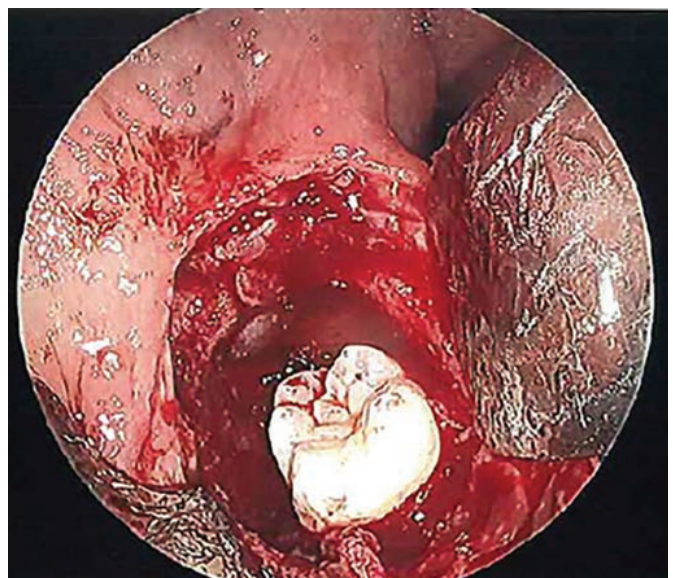


Figure 6. Follow up panoramic 1 year and 5 months later showing impeding #46



DISCUSSION

Cyst location in the case presented is consistent with the literature concerning DCs as most frequently observed in the mandible (70%). Much of the literature also states a slight male predilection, and second in prevalence to the radicular cyst. When looking specifically at children, however, there is some variation. A large study by Zhang and colleagues³ found that, among children, DCs were the most common odontogenic cyst and more common in females. In general, most DCs are considered developmental and occur most commonly in the second and third decades and are associated with third molars and maxillary canines. Again, this is not the case in very young children, making this case uncommon because developmental DCs are rare in the first decade of life.^{3,7} Radiographic appearance alone is not sufficient for definitive diagnosis. Differential diagnosis in this case could also include ameloblastic fibroma, odontogenic keratocyst, and possibly unicystic ameloblastoma emphasizing the need for early detection and intervention.^{4,7,8,9}

The oral surgeon performed a punch biopsy 1 month prior to removing the cyst by enucleation. This is a best practice approach for diagnosis as some practitioners may be tempted to forego this step in the diagnostic process.³ Histologic examination is always the gold standard in definitive diagnosis.^{3,10} Several treatment options are suggested for removal of DCs, while the aim of treatment is complete elimination of pathology and maintenance of dentition with minimal surgical intervention.⁹ The choice of therapeutic approach is based on the size and location of the cyst, integrity of the cystic epithelial lining, client

age, proximity of the cyst to adjacent vital teeth, and relationship with anatomical structures. Children have a much greater and quicker capacity to regenerate bone than adults, and immature teeth have a greater eruptive capacity.^{7,9} A conservative surgical approach is preferred for function and esthetic value, rather than cyst/tooth removal as is the treatment for many developmental DCs located in the third molar and maxillary canine regions of older clients.^{1,9} The clinician in this case chose cyst enucleation and preservation of the involved permanent tooth due to the location of the cyst and involved teeth. As noted in the literature, this method of treatment was the best option for this case to preserve the impacted tooth.^{7,9}

This case may beg the question as to the type of dentigerous cyst in this child. Is it a rare case of a developmental cyst, or is it perhaps of inflammatory origin? The pathology report did not include specific histology; it simply documented the lesion as being a dentigerous cyst. Benn and Altini², some of the first researchers to categorize some DCs as inflammatory, note that inflammatory DCs occur in immature teeth as a result of inflammation from a diseased deciduous tooth or other source spreading to involve the tooth follicle. This case was of a DC around the crown of a first permanent molar which had no overlying deciduous tooth, making it unlikely to be of inflammatory origin. A more specific microscopic description of cellular content of the lesion components by the pathologist could have assisted in determining the particular type of cyst in this case, as we know that histologic examination is the gold standard.^{3,10}

As seen in Figure 6, the tooth has continued to develop normally, although it appears that it may be impeding

the eruption of 47. Orthodontic intervention may be in order for proper eruption and alignment of the permanent teeth as seen in other cases in the literature.^{7,9,11} Several authors have noted the necessity of orthodontic treatment after cyst diagnosis and removal.^{9,11} Miyawaki et al¹² note that there is an optimal period for surgical treatment of a dentigerous cyst in order for the tooth to be able to erupt. This further emphasizes the importance of early detection and treatment.

The frequency of dental anomalies detected in pediatric panoramic radiographic images is close to 30%.¹³ The current radiographic guidelines of the American Academy of Pediatric Dentistry recommend posterior bitewings and panoramic exam after the eruption of the first permanent tooth. The guidelines also state, however, that clinical judgment be exercised as to the radiographic need based on clinical signs and symptoms.¹⁴ In this case, the only baseline radiographs were bitewings that did not show the cyst, nor did the periapical image exposed at the initial restoration appointment. Upon obtaining the periapical film of 85 prior to the second attempt at restoring, a portion of the cyst was observed in the image, necessitating the panoramic image. Early diagnosis and removal of this cyst is important considering future complications that may arise with the lesion. If undetected and left untreated, more serious lesions sometimes develop from cellular change within a DC, such as the ameloblastoma, intraosseous mucoepidermoid carcinoma, and odontogenic keratocyst.⁷

Dental hygienists are often the oral health professional responsible for suggesting exposure of the appropriate radiographs and noting findings for further examination by the dentist. This case can serve to raise awareness among dental hygienists of the possibility of dentigerous cysts occurring in young children rather than the typical presentation around third molars and maxillary canines. This client had not only a DC, but also a congenitally missing maxillary lateral incisor, in addition to extensive decay. This case also emphasizes the important role of dental hygienists in reviewing radiographs for incidental findings. Knowledge of DCs and other pathologies and their possible ramifications can aid in clinical decision making for radiographic assessment, as well as treatment and referral options in young children.

CONCLUSION AND RECOMMENDATIONS

Dental hygienists are in a unique position to assist in identifying oral abnormalities during the assessment phase of the dental hygiene process of care. Although most dentigerous cysts are considered developmental in origin and primarily associated with third molars and permanent maxillary canines, it is important to recognize that they may also present in young children, could be of inflammatory origin, and may affect developing permanent teeth.

This case study confirms the importance of carefully reviewing radiographs and the implications of unidentified and untreated disease. Equipped with knowledge about

oral pathology, dental hygienists can greatly assist the dentist in diagnosis and referral, and provide anticipatory guidance for parents of young children as they seek to establish optimum oral health for their clients of all ages.

CONFLICTS OF INTEREST

The authors have declared no conflicts of interest.

REFERENCES

1. Speight P, Fantasia FE, Neville BW. Dentigerous cyst. In El-Naggar AK, Chan JKC, Grandis JR, Takata T, Sloatweg PJ, editors. *WHO classification of head and neck tumours*, 4th ed. Lyon: International Agency for Research on Cancer; 2017. pp. 234–35.
2. Benn A, Altini M. Dentigerous cyst of inflammatory origin. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 1996;81:203–209.
3. Zhang LL, Yang R, Zhang L, Li W, MacDonald-Jankowski D, Poh CF. Dentigerous cyst: a retrospective clinicopathological analysis of 2082 dentigerous cysts in British Columbia, Canada. *Int J Oral Maxillofac Surg*. 2010;39(9):878–82.
4. Jones A, Craig G, Franklin C. Range and demographics of odontogenic cysts diagnosed in a UK population over a 30-year period. *J Oral Pathol Med*. 2006;35:500–507.
5. Neville BW, Damm DD, Allen CM, Chi AC. *Oral and maxillofacial pathology*. 4th ed. St. Louis, MO: Elsevier; 2016. pp. 325–35.
6. Makkar V, Kamboj M, Narwal A. Convolutions of dentigerous cyst: an institutional experience. *J Exp Ther Oncol*. 2018;13(1):65–70.
7. Tuwirqi AA, Khzam N. What do we know about dentigerous cysts in children: a review of literature. *J Res Med Dent Sci*. 2017;5(2):67–79.
8. Nelson BL, Folk GS. Ameloblastic fibroma. *Head Neck Pathol*. 2009;3:51–53.
9. Mohapatra PK, Joshi N. Conservative management of a dentigerous cyst associated with an impacted mandibular second premolar in mixed dentition: a case report. *J Dent Res Dent Clin Dent Prospects*. 2009;3(3):98–102.
10. Santosh ABR. Odontogenic cysts. *Dent Clin North Am*. 2020;64(1):105–119.
11. Motamedi MH, Talesh KT. Management of extensive dentigerous cysts. *Br Dent J*. 2005;198(4):203–206.
12. Miyawaki S, Hyomoto M, Tsubouchi J, Kirita T, Sugimura M. Eruption speed and rate of angulation change of a cyst-associated mandibular second premolar after marsupialization of a dentigerous cyst. *Am J Orthod Dentofacial Orthop*. 1999;116:578–84.
13. Marsillac MW, Andrade MR, Marcal RO, Santos VL. Dental anomalies in panoramic radiographs of pediatric patients. *Gen Dent*. 2013;61(7):29–33.
14. American Academy of Pediatric Dentistry. Prescribing dental radiographs for infants, children, adolescents, and individuals with special health care needs. In: *The Reference Manual of Pediatric Dentistry*. Chicago, IL: AAPD; 2020. pp. 225–32.