

Literary review of dentigerous cyst: case report.

Abstract:

Introduction: Dentigerous cysts are benign lesions of an aggressive and progressive nature that can compromise important anatomical structures. A mutation in the transcription factors MSX-1, PAX9 and PITX2, which are involved in enamel proliferation during the bell stage, is considered to trigger the appearance of this type of cyst.

Objective: To report the clinical case of a pediatric patient who underwent a surgical procedure in order to enucleate a dentigerous cyst.

Case presentation: Male patient, 7 years old, originally from the city of Morelia, Michoacán. Mexico. Asymptomatic, with facial asymmetry. With a 3x2cm volume increase in the lower right hemiarch. No significant history of his current illness.

Conclusions: The surgical treatment of dentigerous cysts in pediatric patients requires interdisciplinary work between a maxillofacial surgeon, a pediatric dentist and the constant collaboration of tutors.

Key words: Dentigerous Cyst, Odontogenic Cyst, Pediatric Dentistry

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33 **Introduction**

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35 In 1728, Pierre Fauchard hypothesized that cystic swelling of the jaw was related to teeth.
36 Despite this advancement, a specific term for this condition was not coined until 1853,
37 when Prein J and Remagen W introduced the concept of the “dentigerous cyst” to describe
38 a variety of odontogenic cysts^{1,2}.

39 Currently, the exact cause of dentigerous cyst formation remains a mystery in the field of
40 dentistry. However, a theory has been proposed suggesting that this cyst may arise as a
41 result of fluid accumulation around the developing crown, as well as in supernumerary
42 teeth. Based on this hypothesis, it has been postulated that mutations in the transcription
43 factors MSX-1, PAX9, and PITX2, which are involved in enamel proliferation during the
44 bell stage, could trigger the development of this type of cyst³.

45 In addition to these genetic factors, the Wnt/ β -catenin protein has been observed to play a
46 fundamental role in the signaling pathways that initiate tooth formation, marking a crucial
47 milestone in the process. In experiments conducted in mice, the deletion of the
48 adenomatous polyposis coli (APC) protein from the embryonic epithelium led to the
49 indiscriminate formation of supernumerary teeth, suggesting the importance of this
50 signaling pathway in regulating dental development^{4,5}.

51 It is one of the most common odontogenic cysts, accounting for approximately 20% of all
52 epithelial lining cysts in the oral cavity. It is also distinguished by its association with
53 supernumerary teeth, being observed in approximately 5% of cases. It occurs in mesiodens
54 and maxillary third molars. In the mandible, it most commonly appears in the canines, third
55 molars, and primary first molars. This pathological entity shows a male predilection with a
56 7:1 ratio, manifesting between the second and fourth decades of life⁶⁻⁸.

57 The dentigerous cyst is an aggressive and progressive pathology that, despite its
58 asymptomatic nature, can have significant effects on the surrounding bony structures. Its
59 main characteristic is the expansion of the cortical bone due to fluid accumulation within it,
60 generating prolonged osmotic pressure. This type of cyst is usually associated with the
61 crown of an unerupted tooth, presumably originating at the cemento-enamel junction.
62 Although it may appear that the cyst completely surrounds the dental crown, studies have
63 shown that it may in fact be located laterally to it or involve only a portion of the root. Its
64 secondary effects include displacement of adjacent teeth, resorption of dental roots, and, in
65 some cases, the formation of oronasal communications and the appearance of inferior
66 alveolar nerve paresthesia^{3,7,8}.

67 A dentigerous cyst usually presents as a radiographic finding characterized by a well-
68 defined, unilocular radiolucent osteolytic lesion with well-circumscribed borders. For an
69 accurate diagnosis, it is recommended to perform a radiograph or cone-beam computed
70 tomography (CBCT)⁶.

In anatomopathological studies, it presents a fibrous stroma lined by squamous and cuboidal epithelium, up to six cell layers in thickness. In the cyst wall, a focal lining of simple squamous epithelium is observed, accompanied by a lymphocytic and plasmacytic interstitial inflammatory infiltrate. Histologically, the wall is described as having a brownish and friable fibrous appearance, with possible focal hyaline bodies and, occasionally, mucous or sebaceous metaplasia. Likewise, a wall composed of loose to myxoid fibrous connective tissue has been observed, along with epithelial hyperplasia and thickening, foamy macrophages, and cholesterol clefts associated with giant cells^{6,8}.

The treatment of choice is enucleation and curettage of the cyst, accompanied by endodontic treatment of the teeth adjacent to the lesion. When the procedure is performed in large lesions, bone regeneration has been suggested; however, its use remains controversial⁶.

Clinical Case

A 7-year-old male patient was referred to the Department of Maxillofacial Surgery at the Children's Hospital of Morelia by the Pediatric Dentistry Department due to an increase in volume in the right mandibular body, with an evolution of approximately 3 months. No relevant medical history was reported for his current condition. The guardian reported that the lesion had shown progressive, asymptomatic growth without limitations in mastication.

On physical examination, facial asymmetry was observed, with a midline hairline insertion, the presence of a hypertrophic scar in the interbrow region, and an increase in volume of the right lower third of the face. Intraoral examination revealed generalized gingivitis, the presence of a pathological fracture of tooth 85, and an increased volume in the vestibular sulcus measuring 3 × 2 cm, extending from tooth 84 to the mesial aspect of tooth 46. The lesion was compressible on palpation, normothermic, normochromic, painful on digital pressure, with a fluid-like displacement, and non-displaceable. Figure 1. Panoramic radiography revealed a well-defined radiolucent area with radiopaque borders, involving tooth 45. Figure 2.



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100 **Figure 1:** Intraoral photograph showing an increase in volume in the right mandibular
101 hemiarch.

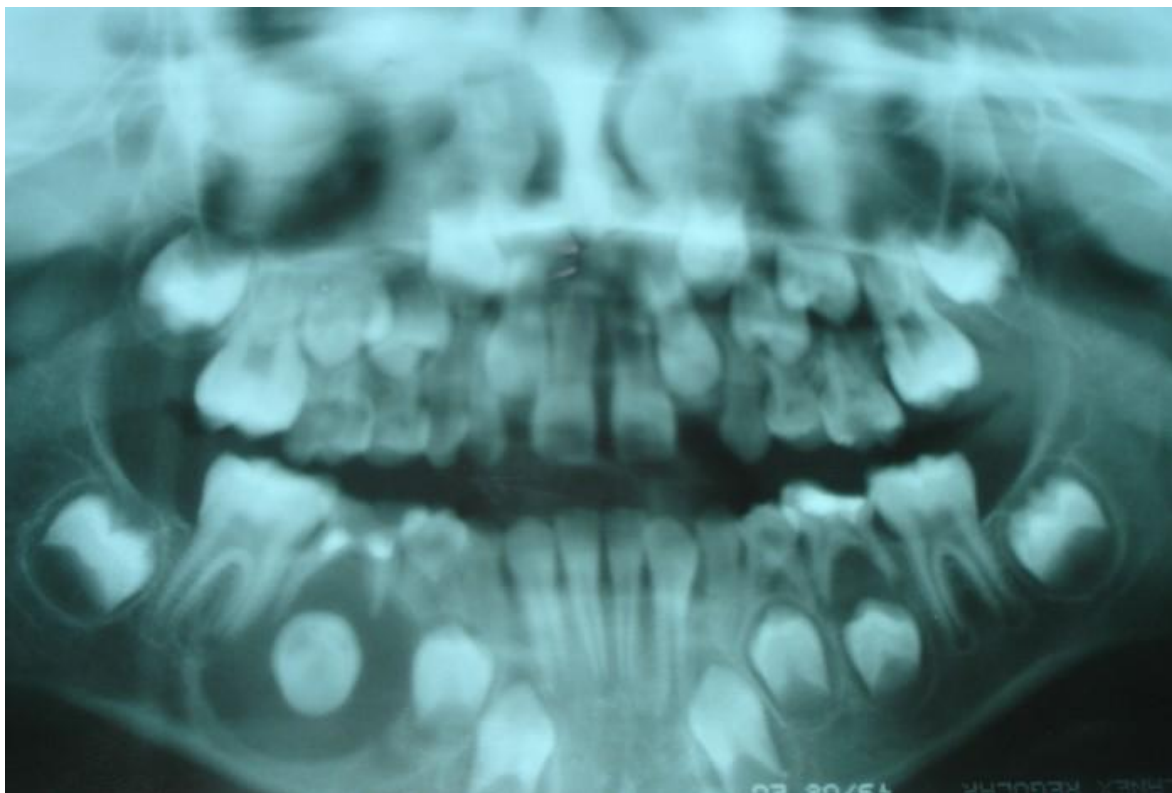
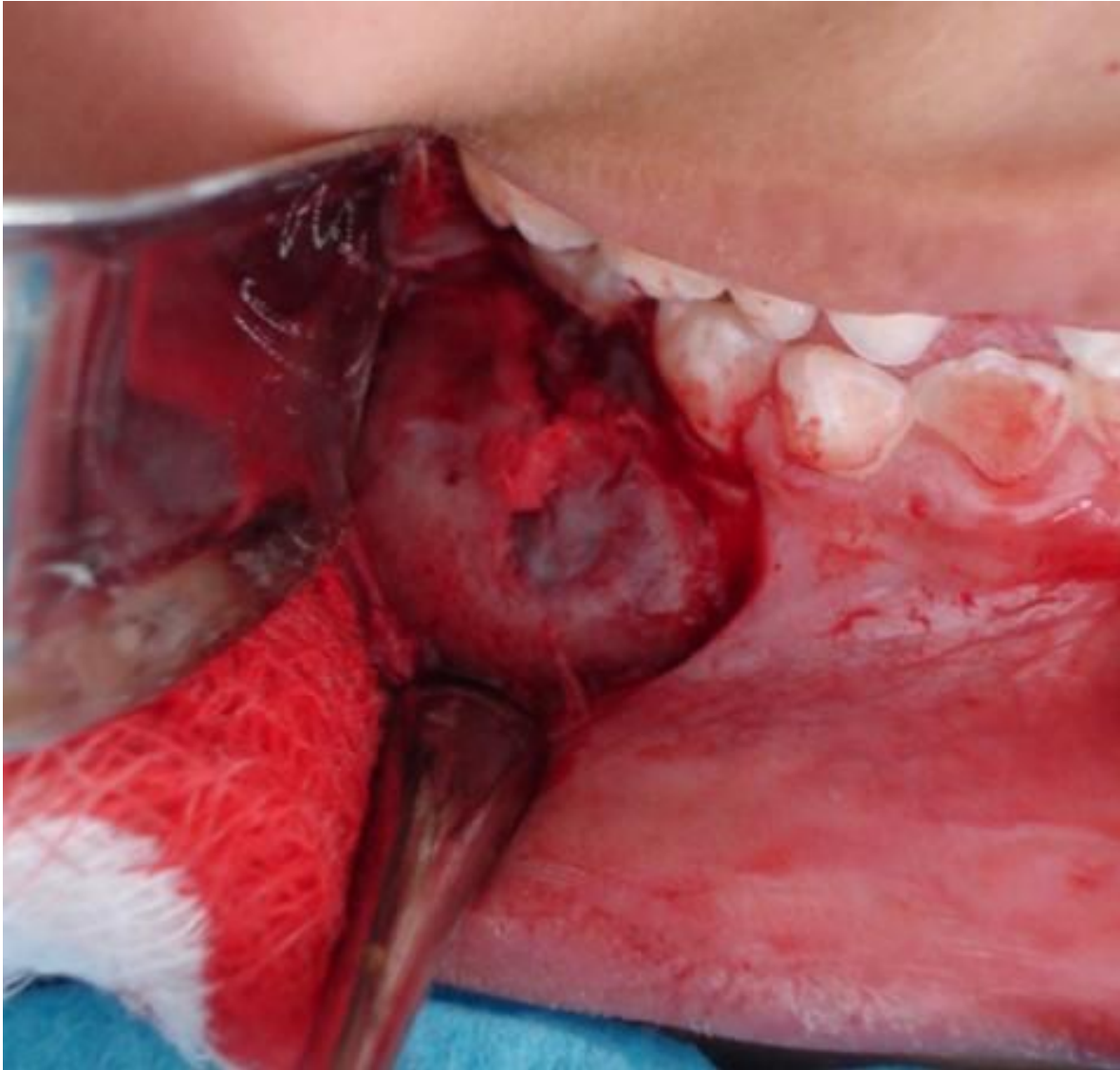


Figure 2: Panoramic radiograph showing a well-defined radiolucent area containing the crown of a tooth in the lower right mandible.

Under general anesthesia, aspiration of the intraluminal lesion was performed, obtaining 2 cm³ of cystic content. Once the pathological cavity was decompressed, a mucoperiosteal flap was raised and a bony window was created for cyst enucleation. Figure 3. The specimen was sent for biopsy, yielding the following results. Macroscopically, a 2.5 × 2 × 2 cm specimen was received, with an irregular outer surface, reddish-brown in color with areas of bright red congestion. In its central portion, a tooth measuring 1 × 1 cm with preserved morphology was identified. Microscopically, the lesion showed a wall with intense acute and chronic active inflammation, focal microhemorrhages, and granulation tissue in an active proliferative phase. Within the inflamed tissue, at the inferior border of the wall, a lining of stratified squamous epithelium was observed with focal formation of rete ridges secondary to the inflammatory process. No cellular atypia or keratin formation was identified. Surgical margins showed chronic active inflammation. Figure 4.



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119 **Figure 3:** Well-demarcated cystic lesion, round in appearance, covered by thinned bone
120 tissue and associated with expansion of the cortical bone.

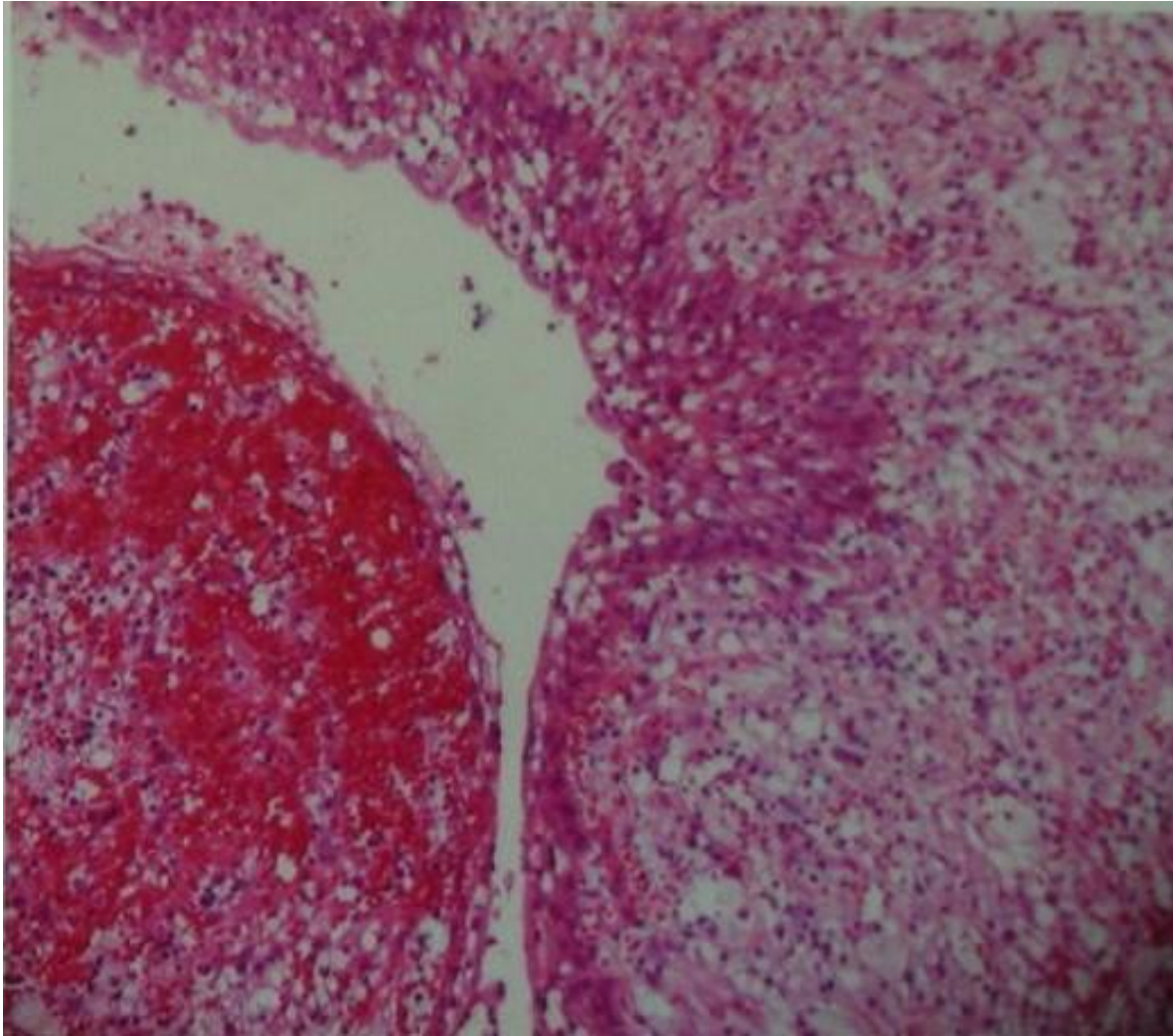


Figure 4: Partially collapsed cystic cavity lined by a thin layer of non-keratinized stratified squamous epithelium of variable thickness. The epithelium shows areas of irregular continuity and in some segments appears separated from the underlying connective tissue.

Discussion

Although the literature evidence demonstrates the importance of requesting three-dimensional imaging studies, it should be considered that there are financial limitations among the patient's guardians. For this reason, surgical management was performed based on panoramic radiography.

131 CBCT allows for a more precise diagnosis by eliminating image superimposition, enabling
132 accurate localization of structural or pathological abnormalities, and is considered to offer a
133 superior cost–benefit ratio compared with other diagnostic imaging modalities⁶.

134 **Conclusion**

135 The surgical treatment of dentigerous cysts in pediatric patients requires interdisciplinary
136 collaboration between the maxillofacial surgeon, the pediatric dentist, and the continuous
137 involvement of the patient’s guardians to ensure proper clinical evolution and outcome.

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