

Treatment modalities of dentigerous cysts: literature review

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ABSTRACT | There are some theories regarding the emergence of dentigerous cysts. Among them, one claims they originate from the separation of the follicle in the crown of an erupted tooth, and another, that fluid accumulates between the crown and the reduced epithelium. Even with the existing research, its etiopathogenesis still remains unknown. Cysts can be treated in several ways, among them: enucleation, marsupialization, decompression, cryotherapy, endoscopy, and their combinations. *Objective:* To review the literature on dentigerous cyst treatment. *Material and methods:* This is a narrative literature review of articles written in Portuguese and English, and published from 2011 to 2021, which are available at the SciELO, BVS, and PubMed databases. *Conclusion:* We found that cyst enucleation is considered the treatment of choice whenever feasible, but since this technique destroys a significant amount of tissue, other more conservative options can be used. However, the adequate technique will vary according to the characteristics of the lesion and the patient.

DESCRIPTORS | Odontogenic Cysts; Dental Care; Odontogeneses.

RESUMO | **Modalidades de tratamento de cistos dentígeros: revisão de literatura** • Há algumas teorias sobre o surgimento de cistos dentígeros. Entre elas, uma afirma que eles se originam da separação do foliculo na coroa de um dente erupcionado, e outra, que fluido se acumula entre a coroa e o epitélío reduzido. Mesmo com a pesquisa existente, sua etiopatogênese ainda permanece desconhecida. Cistos podem ser tratados de várias formas, entre elas: enucleação, marsupialização, decompressão, crioterapia, endoscopia e combinações entre elas. *Objetivo:* Rever a literatura sobre tratamento de cistos dentígeros. *Material e métodos:* Esta é uma revisão narrativa de artigos escritos em português e inglês, publicados entre 2011 e 2021, disponíveis nas bases de dados SciELO, BVS e PubMed. *Conclusão:* Descobrimos que a literatura considera enucleação de cistos como o melhor tratamento sempre que possível, mas, dado o grau de destruição provocado por essa técnica, outras opções mais conservadoras podem ser utilizadas. No entanto, a técnica mais adequada variará de acordo com as características da lesão e do paciente.

DESCRITORES | Cistos Odontígeros; Assistência Odontológica; Odontogênese.

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INTRODUCTION

Nowadays, there are several theories for the development of dentigerous cysts. Among them, one claims they originate from the separation of the follicle around the crown of an erupted tooth, whereas another states that after the complete formation of the crown, either fluid accumulates between it and the reduced epithelium or an inflammation in the periapical tissues, originating from the necrotic pulp of old deciduous teeth, cause these cysts. Even with these data, their etiopathogenesis still remains unknown. So, it seems that this pathology may be linked to the reduced epithelium of the enamel organ, in which its development begins soon after the formation of the crown. Therefore, its growth is connected to the accumulation of fluid between the reduced epithelium of the enamel organ and the crown of the unerupted tooth.^{1,2}

Dentigerous cysts are developmental in origin, defined as pathological cavities lined with epithelium surrounding the crown of an unerupted tooth.³ It is the second most common type of odontogenic cyst. On average, 75% of cysts are found in the mandible and are associated with third molars, maxillary canines, supernumerary teeth, retained teeth, and odontomas. Usually discovered by radiographic exams, they have a circular radiopaque appearance at their margins and a radiolucent interior. In children, they compose about 49% of intraosseous cystic lesions.⁴

Even though dentigerous cysts can be found in patients with a wide age range, they are even more common in people between 10 and 30 years of age, with a slight preference for males and leucoderma patients. They are usually asymptomatic and may show a history of slow-growing edema; pain may arise only in case of secondary infections.⁵

There are several types of possible treatments for dentigerous cysts, among them are: enucleation, marsupialization, decompression, cryotherapy,

endoscopy, and a combination of these treatments. The first three are the most commonly used.⁶

It is of fundamental importance that the choice of treatment be the best possible for the patient and the cyst. The appropriate choice is made based on the size, age, and location of the cyst. Prognosis is favorable when the cyst is removed completely, but, although rare, they may turn into an ameloblastoma or some malignant neoplasm.⁷

This study aims to show the modalities of dentigerous cyst treatment, their indications, advantages and disadvantages, as well as the criteria for choosing each technique via a narrative literature review.

DISCUSSION

For the treatment of dentigerous cysts, one should evaluate the patient's age, the involvement of the lesion with important anatomical structures, clinical-radiographic characteristics, and the individual's prognosis.⁸ The possibility of transformation of the epithelial layer of these cysts, leading to the formation of neoplasms, such as squamous cell carcinoma and ameloblastoma can be explained by the overexpression of the p53 gene, an oncogenic regulator located in chromosome 17 and associated with increased cell proliferation in cysts and tumors.⁹

Among treatment modalities, marsupialization is an easily performed surgery that reduces intracystic pressure, leading to a regression of the lesion volume and enabling bone filling.⁹ This procedure creates a "window" in the cyst wall to drain the contents inside. The wall is then sutured to the oral mucosa to maintain access.¹⁰ As a result, the tissue surrounding the lesion is preserved and, as reported in the literature,¹¹ the dental element associated with the cyst erupts after the surgery. The main limitation of the technique is its long postoperative treatment time, which can cause discomfort for the patient and facilitate the accumulation of food debris, requiring frequent cleaning via irrigation. For this

reason, marsupialization indications are restricted to surgical interventions in very large cysts with difficult surgical access to preserve important adjacent structures or aid in the eruption of teeth associated with cysts.¹⁰

Enucleation, on the other hand, is indicated in cases of cyst removal from gnathic bones. It is a safe technique that neither sacrifices other underlying structures nor requires irrigation of the marsupialized cavity, besides allowing the histopathological examination of the entire lesion.¹² However, one should be aware of the risk of fracture in case of mandibular lesions, as well as the involvement of healthy tissue and teeth near the lesion.¹³

Marsupialization and enucleation can be indicated separately or in combination. Enucleation after marsupialization reduces morbidity and considerably accelerates healing.⁷ In these cases, the development of a thick cystic lining and the evolution of a bony scar occur, which facilitates the complete removal of the lesion.¹⁴ These factors, when observed clinically, make enucleation a less complex procedure if performed complementarily.

Also found in the literature is the combination of enucleation with osteotomy using a drill to remove one to two mm of bone around the cystic cavity. The technique is used to remove any remaining tissue that may have remained in the cavity, preventing the cyst from recurring.¹³ Its disadvantage is that curettage is more invasive and can be destructive to the bone and other healthy structures nearby. It should, therefore, be performed with great caution, especially in regions involving important anatomical structures.¹⁵

Another possible treatment method is decompression with an obturator device installed adjacent to the lesion, enabling its irrigation. This device acts like a foreign body, attracting body defense cells, and consequently reducing the cyst in a short period of time. The installation of the obturator device is indicated mainly when the lesion

has close contact with noble anatomical structures, as it is a non-invasive and conservative method.¹⁶

Exodontia can also be considered as a form of treatment. In some cases, the tooth is completely involved in the lesion and needs to be removed. In other circumstances, however, it is possible to preserve the tooth in the oral cavity, with or without the need for endodontic treatment.^{7,17}

Cryotherapy has also been used in the treatment of dentigerous cysts because of the ability of liquid nitrogen to devitalize bone *in situ* and maintain inorganic structures intact, reducing the frequency of recurrence, providing less comorbidity, and preserving function. Although promising, this modality is little present in the studies used in this work.¹

The association of marsupialization with orthodontic extrusion is also addressed in the literature, a conservative treatment of real efficiency which enables the preservation of teeth near the cysts, promoting their eruption and healing.¹⁸

A more technological approach consists of endoscopic surgery associated with the traditional treatments mentioned above. A rigid endoscope with an angulation of 0° to 70° degrees is used, providing visibility for access to the lesion in a less invasive way. It is indicated for cysts that are in a more ectopic position, such as those near the nasal sinus. This method shows promise, given the non-recurrence of lesions and the possibility of preserving the tooth, if it has a chance to erupt in the correct position.¹⁹

The literature reports several possibilities of odontogenic cysts management.^{1,7,9-19} However, there is no standardization or established protocol for the treatment of large cysts in the maxillofacial region. In this study, enucleation was reported as the reference treatment for complete removal of the lesion,^{7,12-14} whereas marsupialization is the technique of choice for the treatment of children up to 11 years of age, due to the higher percentage of spontaneous tooth eruption after the

procedure^{7,9-11,14,18-20}. In general, the therapeutic choice should be individualized for each case, considering lesion characteristics, such as size, location, involvement of teeth, and other anatomical structures, and patient preferences.

CONCLUSION

Enucleation of the cyst is considered the treatment of choice whenever possible. However, due to the degree of destruction generated by this technique, other more conservative options are proposed, such as marsupialization, decompression, endoscopy, cryotherapy, exodontia or a combination of treatments, aiming to preserve the anatomical structures adjacent to the lesion. However, the technique to be used will vary according to the characteristics of the lesion and the patient. Therefore, all variables should be well evaluated before choosing any treatment, seeking more safety and comfort to the patient.

REFERENCES

1. Amorim KS, Dantas ACGC, Nascimento AMS, Rios MLS, Albuquerque RLC Jr, Souza LMA. Cisto dentífero com transformação ameloblástica. *Rev Cubana Estomatol.* 2021;58(1):e3028.
2. Chung KR, Noh MK, Oh SH, Jeong DM, Kim SH, Nelson G. Treatment of 2 impacted molars in a large dentigerous cyst (expansile cystic lesion) with combined orthodontic and surgical therapy. *Am J Orthod Dentofacial Orthop.* 2020;158(5):752-8. Doi: <https://doi.org/10.1016/j.ajodo.2020.06.029>.
3. Morais HHA, Dias TGS, Vasconcellos RJH, Vasconcellos BCE, Melo AR, Gondim DA, et al. Bilateral mandibular dentigerous cysts: a case report. *Rev Gauch Odontol.* 2014;62(3):299-304. Doi: <https://doi.org/10.1590/1981-8637201400030000010641>.
4. Martorelli SBF, Leite CLCD, Leite DSG, Barbosa MR, Holanda LAL. Voluminoso quiste dentífero de mandíbula tratado em dos etapas quirúrgicas informe de caso. *Odontoestomatologia.* 2021;23(37):e405. Doi: <http://doi.org/10.22592/ode2021n37a11>.
5. Shetty RM, Dixit U. Dentigerous cyst of inflammatory origin. *Int J Clin Pediatr Dent.* 2010;3(3):195-8. Doi: <https://doi.org/10.5005/jp-journals-10005-10761>.
6. Oliveira HCC Jr, Chaves Netto HDM, Rodrigues MTV, Pinto JMV, Nóia CF. Descompressão cirúrgica no tratamento de lesões císticas da cavidade oral. *Rev Cir Traumatol Bucod-Maxilo-Fac.* 2014;14(1):15-20.
7. Caliento R, Mannarino FS, Hochuli-Vieira E. Cisto dentífero: modalidades de tratamento. *Rev Odontol UNESP.* 2013;42(6):458-62.
8. Rodríguez Castellanos A, Barrera Garcell M, Rodríguez Rey HM. Tratamiento multidisciplinario em um niño afectado por un quiste dentífero. *Medisan.* 2021;25(4):924-33.
9. Scariot R, Costa DJ, Rebellato NLB, Müller PR, Gugisch RC. Treatment of a large dentigerous cyst in a child. *J Dent Child (Chic).* 2011;78(2):111-4.
10. Pinto GNS, Figueira JA, Gonçalves ES, Sant'ana E, Tolentino ES. Marsupialização como tratamento definitivo de cistos odontogênicos: relato de dois casos. *RFO UPF.* 2015;20(3):361-6. Doi: <https://doi.org/10.5335/rfo.v20i3.5209>.
11. Nahajowski M, Hnitecka S, Antoszevska-Smith J, Rumin C, Dubowik M, Sarul M. Factors influencing an eruption of teeth associated with a dentigerous cyst: a systematic review and meta-analysis. *BMC Oral Health.* 2021;21(1):180. Doi: <https://doi.org/10.1186/s12903-021-01542-y>.
12. Guruprasad Y, Chauhan DS, Kura U. Infected dentigerous cyst of maxillary sinus arising from an ectopic third molar. *J Clin Imaging Sci.* 2013;3(Suppl 1):7. Doi: <https://doi.org/10.4103/2156-7514.117461>.
13. Silva MP, Zenatti R, Conci R, Garbin EA Jr, Magro NE, Griza GL. Enucleation of extensive dental cyst in ambulatory environment: case report. *Brazilian Journal of Health Review.* 2021;4(3):10606-19. Doi: <https://doi.org/10.34119/bjhrv4n3-081>.
14. Andrade ACRR, Barreto BR, Brito LGC, Diniz BB, Silva FGT, Carolino RA. O cisto dentífero, suas implicações clínicas e cirúrgicas: relato de caso atípico. *Arch Health Invest.* 2018;7(1):45. Doi: <http://doi.org/10.21270/archi.v7i0.3055>.
15. Maciel J, Almeida MM, Garcia IR. Tratamento cirúrgico de cisto odontogênico. Relato de caso. *Arch Health Invest.* 2018;7(3):433. Doi: <http://doi.org/10.21270/archi.v7i0.3910>.
16. Guimarães RT, Oliveira MH, Rodrigues IB, Silva JCL, Gaetti-Jardim EC. Descompressão de cisto dentífero: relato de caso. *PECIBES.* 2019;5(Suppl 1):18-43.
17. Mombach FJ, Sartori EM. Exodontia do dente 48 para diagnóstico de lesão cística. *Arch Health Invest.* 2018;7(4):62. Doi: <http://doi.org/10.21270/archi.v7i0.3668>.

18. Abu-Mostafa N, Abbasi A. Marsupialization of a large dentigerous cyst in the mandible with orthodontic extrusion of three impacted teeth: a case report. *J Clin Exp Dent.* 2017;9(9):e1162-6. Doi: <http://doi.org/10.4317/jced.53890>.
19. Santana NM, Rebellato NLB, Machado MAN. Divergências de tratamento do cisto dentífero: revisão sistemática. *Rev Cir Traumatol Buco-Maxilo-Fac.* 2012;12(1):85-92.
20. Souza BC. Cisto dentífero de grande dimensão em maxila: relato de Caso. *Journal of Health.* 2020;1(23):1-8.