

## Treatment of extensive cystic lesion in the maxilla associated with dens in dente

Tratamento de lesão cística extensa em maxila associada a dens in dente

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### ABSTRACT

Dens in dente is a dental development malformation that involves more commonly the upper lateral incisors. Infection of the canal of these teeth can cause the formation of chronic periapical lesions. The present study aimed to describe an integrated approach between the endodontic therapy and surgical intervention in an upper lateral incisor with dens in dente type II. A female patient, 14 years old, sought for dental care complaining of left palatal and paranasal bulging. Clinical, radiological and histopathological findings suggested periradicular cyst. First, marsupialization was performed to reduce the size of the lesion and to favor its enucleation, with less risk of injuring the tooth and vital structures. After diagnosis of pulp necrosis and in attempt to reduce the infection via canal, we used the reciprocating instrumentation associated with irrigation with sodium hypochlorite, intracanal medication based on calcium hydroxide and filled with a thermoplastic filling. After a year of marsupialization, fistulectomy and complete enucleation of the lesion were performed. Prosevation was performed 1, 3, 6 and 12 months following marsupialization. Six months after enucleation, we observed the periradicular repair and remission of symptoms. The extensive apical lesion associated with dens in dente type II can be treated with a combination of surgical and endodontic therapy.

### KEYWORDS

Dens invaginatus; Endodontic treatment; Surgery

### RESUMO

Dens in dente é uma malformação no desenvolvimento dentário que envolve mais comumente os incisivos laterais superiores. A infecção do canal destes dentes podem causar a formação de lesões periapicais crônicas. O objetivo deste trabalho é descrever uma abordagem integrada entre a terapia endodôntica e a intervenção cirúrgica em um incisivo lateral superior com dens in dente tipo II. Paciente de 14 anos, gênero feminino, procurou atendimento odontológico com queixa de abaulamento em região palatina e paranasal esquerda. Os achados clínico, radiográfico e histopatológico sugeriram cisto perirradicular. Marsupialização foi realizada inicialmente para reduzir o tamanho da lesão, favorecer a enucleação da mesma, com menor risco de injuriar o dente e as estruturas vitais. Diagnosticado necrose pulpar e na tentativa de combater a infecção via canal, empregou-se a instrumentação recíproca associada a irrigação com hipoclorito de sódio, medicação intracanal a base de hidróxido de cálcio e finalizou-se com uma obturação termoplastificada. Após um ano do procedimento de marsupialização realizou-se a fistulectomia e a completa enucleação da lesão. A prosevação foi realizada 1, 3, 6 e 12 meses posteriormente a marsupialização. Seis meses após a enucleação observou-se a reparação perirradicular e remissão dos sintomas. A extensa lesão perirradicular associada ao dens in dente tipo II pode ser solucionada com uma combinação entre a intervenção cirúrgica e endodôntica.

### PALAVRAS-CHAVE

Dens in dente; Tratamento endodôntico; Cirurgia.

## INTRODUCTION

**D**ens in dente is a dental development malformation that may have different anatomical variations, both in the crown and the root [1]. This change is the invagination of the enamel organ into the dental papilla, beginning at the crown before calcification, and may extend to the apex and form another foramen [2]. Its etiology is not completely understood, and the suggested theories include tissue pressure, trauma, infection, delay or acceleration of the proliferation of the internal enamel epithelium or genetic factors [1,3].

The frequency of the dens in dente varies from 0.04% to 10% [4], and upper lateral incisors are the most affected, followed by upper central incisors and canines [5]. However, dens in dente in the lower mandible has been a rare condition [6].

According to Oehlers, dens in dente are classified as: a) type I - minimum invagination and not extending beyond the cemento-enamel junction, confined only to the crown; b) type II - invagination extends to the cemento-enamel junction, may or may not communicate with the pulp but does not communicate with the periodontal ligament; c) type III - there is a communication with periodontal ligament forming a second foramen but has no direct contact with the pulp [1,7].

Cases of dens in dente can be detected after routine x-ray examinations by means of a panoramic x-ray and confirmed by a periapical radiograph. Clinically, the morphological change of the crown may serve as a guideline for the diagnosis of dens in dente [8]. There are several modes of treatment, because they depend on the severity and extent of the malformation. The treatment approaches include the sealing of invagination, endodontic treatment associated or not with surgery and tooth extraction [9].

This study aimed to describe an integrated approach between the endodontic

therapy and surgical intervention in an upper lateral incisor with dens in dente type II.

## CASE REPORT

A healthy female patient, 14 years old, melanoderm, sought treatment at the Dental Clinic, complaining of swelling in the palate and next to the nose, observed for 2 years. Upon extraoral clinical examination, there was a slight swelling in the left paranasal region. Upon intraoral examination, it was noticed the swelling on palpation in buccal vestibule of teeth 22, 23 and 24 and palatal bulging, adjacent to tooth 22 (Figure 1). In the element 22, there was no sinus tract, as well as pain to percussion and palpation. There was grade I mobility in this tooth without periodontal pocket. During the inspection of the crown, there was no carious lesion or color change. In relation to pulp sensitivity test of elements 21, 22, 23, 24 and 25, it was found negative response only for tooth 22.

Cone beam computed tomography showed an extensive unilocular hypodense lesion, well-defined, with expansion of the buccal-palatal cortical involving periapex of the left lateral incisor. In the same examination, we identified the presence of dens in dente type II of Oehlers (Figure 2).



**Figure 1** - Initial clinical aspect of the patient. **A.** Frontal extraoral photograph of the patient. **B.** Swelling in buccal vestibule of tooth 22. **C.** Palatal swelling adjacent to tooth 22.



**Figure 2** - Initial cone beam computed tomography. **A.** Axial reformat showing extensive unilocular hypodense lesion, well-defined, with expansion of the buccal cortical. **B.** Panoramic reconstruction of maxilla indicating unicystic lesion associated with apex of tooth 22. **C.** Parasagittal reformat identifying the presence of dens in dente type II of Oehlers (arrow).

## MARSUPIALIZATION

The treatment began with marsupialization prior to enucleation of the lesion due to its large extension. After intra- and extra oral antisepsis, a left infraorbital nerve block was performed, complemented by local infiltrative anesthesia, using 2% mepivacaine + epinephrine (1:100.000). Lesion was punctured, evidencing a liquid content of citrus yellow color, confirming the suspicion of cystic lesion. Then, marsupialization of the lesion was performed by removing a fragment of the cystic capsule and making a suture between its

remainder and alveolar mucosa (Figure 3A). The specimen was sent to anatomopathological analysis, which confirmed the diagnosis of inflammatory periradicular cyst. The cystic cavity was filled with gauze bandage, changed daily, and irrigated with saline combined with chlorhexidine digluconate at 0.12% for 15 days. On the day 21 after surgery, the patient showed a good scarring, good local hygiene, with no signs of infection and/or abnormalities (Figure 3B). Then, the patient was referred for endodontic treatment of tooth 22.

## ENDODONTIC TREATMENT

After local infiltrative anesthesia, the crown was accessed with a diamond bur 1012 (KG Sorensen, São Paulo, Brazil) and explored the canal with manual K file (Dentsply Maillefer, Ballaigues, Switzerland). It was advocated the crown-down segmented technique. To prepare the cervical region, a drill LA AXCESS 20/.06 (SybronEndo, Orange, USA) was used and after removing the invagination, odontometry was held with lime Flexofile #25 and apex locator NOVAPLEX® (Forum Engineering Technologies, Rishon Lezion, Israel).

The root canals were prepared with reciprocating system (VDW, Munich, Germany) with the file RECIPROC 25/.08 and irrigation/aspiration with 2.5% sodium hypochlorite



**Figure 3** - **A.** Marsupialization of the lesion at buccal vestibule adjacent to the apex of tooth 22. **B.** Intraoral photography of 21 day-postoperative follow-up. Notice the good scarring and the presence of communication between the cystic cavity and the oral cavity.

(Biodinâmica, Ibiporã, Brazil). The foramen patency was carried out with a K file #30. To remove the smear layer, we used 17% EDTA (Biodinâmica, Ibiporã, Brazil). The calcium hydroxide paste associated with camphor paramonochlorophenol and propylene glycol was introduced and sealed with glass ionomer cement Maxxion R® (FGM, Joinville, Brasil). After 15 days, intracanal medication was removed, and the filling was performed with gutta-percha and zinc oxide based cement and eugenol by hybrid tagger technique. The patient reported no postoperative pain and followed strict follow-up for subsequent enucleation of the lesion.

### FISTULECTOMY AND ENUCLEATION

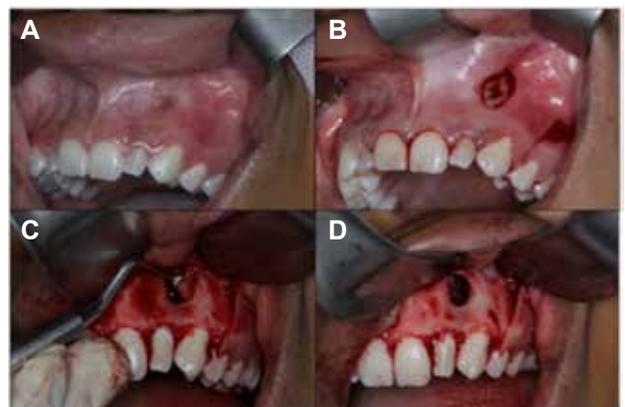
One year after marsupialization, clinical and radiographic examination (Figure 4) evidenced a pronounced regression of the lesion, allowing its enucleation. Intra- and extra-oral antisepsis, bilateral anesthesia of the infra-orbital nerves and nasopalatine nerve block using 2% mepivacaine + epinephrine (1:100.000) were made. Before creating of the flap, fistulectomy was performed through a buccal wedge incision with a scalpel 15, and its entire path has been removed. A low monoangular incision was made, then extending from the mesial of tooth 24 to the distal of tooth 11. The total mucoperiosteal flap has been raised and followed by enucleation of the lesion by curettage with Lucas curette (Figure 5).

### PROSERVATION

Follow-up took place after 1, 3, 6 and 12 months. After the root canal filling of tooth 22 and one year after the marsupialization, it was achieved a satisfactory reduction of the cystic lesion, allowing its complete enucleation. The resolution of the case can be evidenced by cone beam computed tomography 6 months after enucleation (Figure 6 e 7).



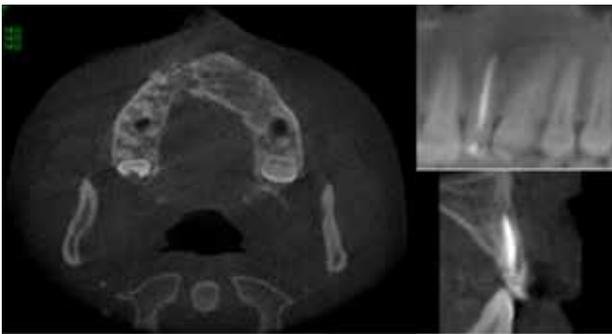
**Figure 4** - Periapical radiograph performed 1 year after marsupialization. Notice adequate root canal filling [22] with regression of the cystic lesion related to the apex of tooth 22.



**Figure 5** - Enucleation of the lesion. **A.** Intraoral clinical aspect one year after marsupialization, showing patency of the fistula. **B.** Fistulectomy and monoangular incision held for enucleation. **C.** Enucleation of the lesion with curettage. **D.** Clinical image after enucleation.



**Figure 6** - Clinical image of 6-month follow-up after enucleation.



**Figure 7** - Cone beam computed tomography showing the reduction of the cystic lesion 6 months after enucleation.

## DISCUSSION

The case reported herein was classified as dens in dente class II of Oehlers by revealing, with the use of radiographic and tomographic examination, enamel invagination without exceeding the cemento-enamel junction after the mineralization phase, and caused no communication with the dental pulp. Morphological changes in tooth crown predispose the development of caries [10], and this can result in pulp inflammation. Upon such pulp involvement, it may evolve to necrosis. However, in this case, the dental crown was intact, without caries, similar to that reported by Chaniotis et al. [11]. The clinical and radiographic examination demonstrated signs of pulp necrosis, but it was confirmed only after the pulp and cavity sensitivity testing. Thus, to remove the infectious content of the root canal of

complex morphology, we performed a thorough cleaning and canal shaping with reciprocating system under abundant irrigation with sodium hypochlorite (2.5% NaOCl), chelating solution (EDTA) and intracanal medication based on calcium hydroxide [5] in an attempt to assist the repair of periapical tissues.

The steps involving the diagnosis and treatment represent an endodontic challenge for clinicians treating a dens in dente. Teeth affected by this malformation may be asymptomatic and therefore, even with large periapical lesions, are not diagnosed [12]. Most cystic lesions develop slowly and there is no painful evolution unless there is an acute inflammatory exacerbation. These lesions are detected on routine radiographs, and the presence of symptoms like mild pain, swelling, tooth mobility may be associated with cyst volume increase [13], which explains the reduced sensitivity of the present case. In addition, cone beam computed tomography allows a three-dimensional view, because, unlike periapical radiograph, the depth plan facilitates the diagnosis of a dens in dente type II. The association of these indicators with clinical aspects projects a fourth dimension, marked by the requirement of time and space [14].

Several options can be found to treat the cases of dens in dente, including non-surgical, surgical and combined approaches [1,7]. In cases of pulp necrosis, regardless of

the size of the periradicular lesion, endodontic treatment should be performed and surgery comes as second choice [9,15]. In this study, we decided to perform a combined endodontic-surgical treatment, because the conservative intervention via canal through a chemical-mechanical preparation is not effective in removing all irritants located in this anomalous morphological structure, corroborating Ortiz et al. [16]. Moreover, due to the extensive related periradicular lesion, there was the need for an association between these two types of treatment [5,17].

When there invagination in the incisal region, sealing or restoration of the area is indicated for the prevention of caries and pulp contamination [1]. In case of change in the pulp, endodontic treatment can be difficult due to irregular shape of the root canal system. When these invaginations can be removed, endodontic treatment has no drawbacks, but in some cases, the invagination should be treated as a separate canal [1]. Some authors use lateral [18,19] or vertical [20] condensation of gutta-percha in root canal filling, but despite this, the canal of the present study was filled using a thermoplastic technique, agreeing with Rotstein et al. [21] and Nallapati [22], who obtained an adequate filling of irregular spaces. The extraction of the tooth may be indicated when the anatomical variation is severe and does not allow other more conservative treatment. Besides that, teeth with aesthetic and functional problems are also considered in this approach [1].

In our study case, marsupialization was held at first as part of the surgical treatment, aimed mainly the regression of the extensive lesion, ensuring its future enucleation. Marsupialization prevents damage to adjacent structures, possible buccosinusal and/or bucconasal communications and reduces postoperative morbidity. In addition, the patient showed up cooperative, which favored this type of treatment, especially considering the local hygiene. Marwah et al. [5] indicate a conservative treatment, and in the case of failure,

a surgical procedure; unlike those authors, our case held an initial marsupialization, followed by endodontic treatment. Enucleation was accomplished after one year, as we observed a satisfactory regression of the lesion, allowing for its complete removal.

The clinical approach adopted for the extensive cystic lesion was initially marsupialization, followed by fistulectomy and enucleation after a year; however the surgical management in these cases is widely discussed [23]. According to Ramachandran et al. [24], surgical approach is preferable in cases of extensive periapical lesions, since the long permanence of the infection can be refractory after a conventional treatment via canal, suggesting the diagnosis of true cyst [25]. The surgical options as alternatives for resolving extensive periapical lesions include marsupialization, decompression (when using devices) and enucleation with or without curettage and associated ostectomy. Marsupialization was previously performed in order to reduce the size of the lesion, and to favor its removal with less risk of injuring the tooth and vital structures [25, 26]. Validating Torres-Lagares et al. [25], enucleation after marsupialization favors a lesser degree of morbidity, low risk of bone fracture or grafting, better preservation of anatomical structures and a more satisfactory repair.

## CONCLUSION

This case showed that extensive periradicular lesion associated with dens in dente type II can be solved with a combination of surgical and endodontic therapy.

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