

Radiolucent image in lower third molar: hidden caries or pre-eruptive resorption?: a case report

Imagem radioluciente em terceiro molar inferior: cárie oculta ou reabsorção pré-eruptiva?: um relato de caso

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ABSTRACT

Caries is a multifactorial disease due to the imbalance of the de/re-mineralization process. Complementary radiographic examinations are able to detect hidden caries. The purpose of this short communication was to investigate the radiolucent image suggestive of hidden caries in lower third molar. The extraction of the tooth, decalcification, inclusion and preparation were performed for histological analysis of the lesion. Histological findings revealed a pre-eruptive resorption, and the etiological factors of this coronary resorption were undefined. The professional should be aware of the occurrences of these lesions to early diagnose and propose appropriate treatment to avoid future complications to the patient.

Indexing terms: Dental caries. Radiography, dental. Tooth resorption.

RESUMO

A cárie é conceituada como uma doença multifatorial condicionada ao desequilíbrio no processo de desmineralização e remineralização das estruturas dentárias. O propósito desse trabalho foi investigar a imagem radiolúcida sugestiva de cárie oculta em terceiro molar. Foi realizado a exodontia do elemento dentário, descalcificação e confecção de lâminas para posterior estudo histológico da lesão. O achado histológico conclui-se tratar de uma reabsorção pré-eruptiva. O profissional deve estar atento às ocorrências dessas lesões para diagnosticar precocemente e propor o tratamento adequado, evitando complicações futuras ao paciente.

Termos de indexação: Cárie dentária. Radiografia dentária. Reabsorção de dente.

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How to cite this article

Sousa MM, Botelho AM, Tavano KTA, Maciel CAB, Douglas-de-Oliveira DW, Mesquita ATM. Radiolucent image in lower third molar: hidden caries or pre-eruptive resorption?: a case report. RGO, Rev Gaúch Odontol. 2023;71:e20230026. <http://dx.doi.org/10.1590/1981-86372023002620220024>

INTRODUÇÃO

Dental caries is considered an infectious multifactorial disease subject to eating habits, bacteria, and the imbalance of the de- and remineralization process of hard dental tissues [1]. Dental caries, that can be present without clinically signs or symptoms, are called hidden caries [2].

Changes in enamel opacity, pigmentation in grooves and fissures are evidence of hidden caries. However, the conclusive diagnosis will be only confirmed with complementary x-ray examinations [3]. Hidden caries may result from the strengthening of the enamel due to the action of fluoride [4].

It is important to note that radiolucent image may be associated with bacteria infiltration, pathological processes of resorption and defects in the enamel and dentin [5].

The aim of this communication was to investigate the suggestive image of hidden caries in impacted lower third molar in association with clinical, radiographic, tomographic and histopathological evidences; in order to elucidate internal resorption in dentin or hidden caries.

CASE REPORT

Female patient, 22 years old, no systemic disease, with good oral hygiene conditions sought the Dentistry clinic of Federal University of Jequitinhonha and Mucuri Valleys (UFVJM) for dental treatment. The main complaint was pain and sensitivity in the right upper second pre-molar, which showed fracture on palatal surface. It were requested periapical and panoramic x-rays (figure 1A).

Based on x-rays examination, there was no complications regarding the fracture mentioned by patient. Radiographically, it was observed the inclusion of all third molars, and it was viewed an extensive radiolucent image below the occlusal enamel of the left lower third molar. The radiolucent image was confirmed by periapical x-ray (figure 1B).



Figure 1. A: Panoramic xray, note the included third molars and the radiolucent image in the lower third molar. B: Periapical xray, note the radiolucent image. C: Atraumatic tooth extraction. D- Extracted tooth, note the dark brown staining. E: Tooth macroscopy analysis.

The patient was submitted to dental treatment of right upper second pre-molar and other needs presented. The patient was informed about the lesion that could be hidden caries, despite the submucosal tooth, or intracoronary resorption. After one year and half of follow-up, the tooth was extracted carefully in order to avoid any damage to its tissue (figure 1C). Thereafter, it was performed cone beam computed tomography on the removed tooth (figure 2).

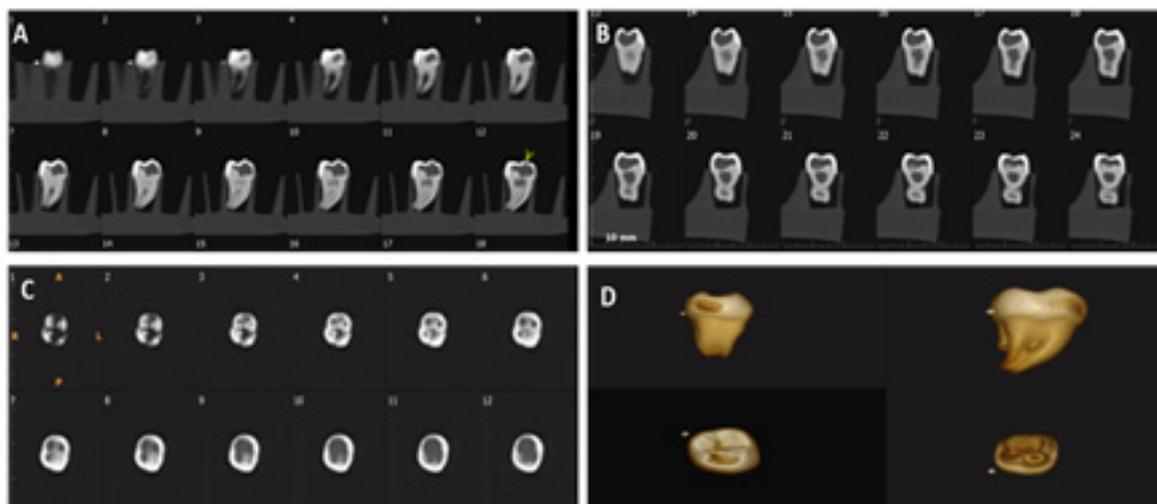


Figure 2. Cone beam computed tomography, no external cavity, note the enamel integrity. A: Sagittal cuts. B: Coronal cuts. C: Axial cuts. D: 3D images.

The extracted tooth was fixed in 10% formaldehyde, and forwarded to the UFVJM Pathology lab for histological analysis by means of hematoxylin-eosin, and Gram techniques. After fixation, a small dark brown staining was observed on the occlusal surface (figure 1D).

The tooth was cut in the mesio-distal direction with diamond wheel. The internal region, which radiolucent appeared on the x-ray, was clear, light colored and poor resistant (figure 1E).

Subsequently, the process of decalcification of these two parts was initiated with immersion in solution of nitric acid at 7%, daily exchanged, aiming to a rapid decalcification process, which could be observed after 9 days.

The tissues were dehydrated in a growing battery of alcohol, diapanized in xylene and immersed in liquid paraffin in a block format. Cuts of 5 micrometers of thickness were performed using a microtome. Then, the staining was performed using routine Hematoxylin and Eosin (H.E.) and the Gram method. The slides were prepared for posterior histological analysis in light microscopy. In order to verify presence of bacterial or microorganisms, it was used the Gram method.

Histological analysis revealed areas of pulpal calcifications, pulpal tissue with hyaline areas and highly collagen regions on the surface of the root pulp, pulp with myxoid appearance, a looser tissue with vascular dilatation in the coronal portion near the region of the supposed carious lesion (figure 3).

It was observed the resorption of the dentin matrix that was replaced by fibrous connective tissue. Presence of internal resorption and an irregular dentine, suggestive of resorption areas associated with advanced demineralization (figure 3). It were observed adipocytes-like cells, areas of tissue degeneration, deposited eosinophilic material similar to osteodentine.

The dental caries lesion diagnose was rejected since the Gram method did not detect colonies of bacteria and/or microorganisms. However, due to the area of infiltrate inflammatory, the Brown and Brenn staining technique was also performed, which confirmed no presence of bacteria.

It was obtained written consent from the patient to publish this report.

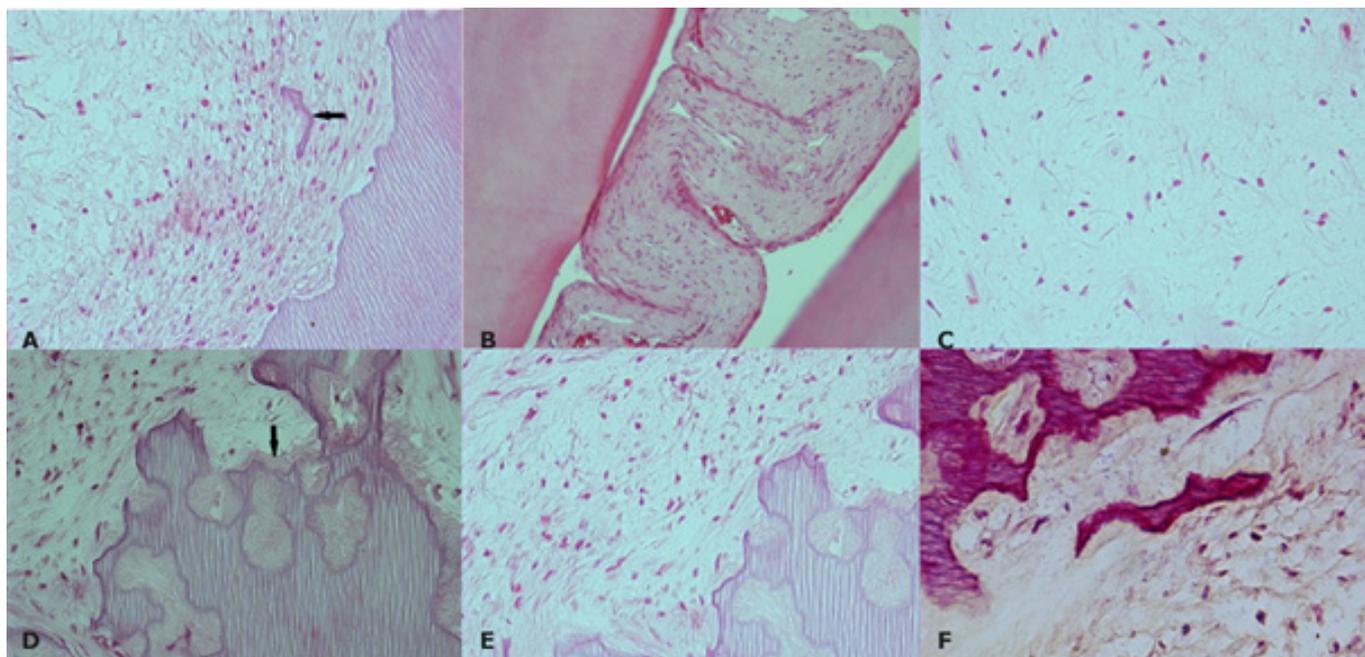


Figure 3. Microscopy analysis. A: Arrow: pulpar calcification (40x, HE staining). B: fibrocellularized pulp tissue (40x, HE staining). C: Coronal pulp, loose and myxoid tissue (40x, HE staining). D: Arrow: internal resorption (40x, HE staining). E: Inflammatory infiltrate in the resorption area (40x, HE staining). F: Absence of microorganisms (40x, Brown e Brenn staining).

DISCUSSION

The present case reported a preliminary diagnosis of a radiolucent lesion by radiographic examination. The etiology of hidden lesions can originate in pre-eruptive processes that include intracoronal reabsorption of unerupted teeth in the oral cavity [6]. This fact could fit in the present study, since the lower third molar was absent in the oral cavity. Hidden caries studies have shown that radiolucent areas were present even before the tooth eruption [6], suggesting that the hidden caries may have its origin in the pre-eruptive process.

The detection of these lesions can be performed through careful clinical examinations, complemented by interproximal radiographs with satisfactory quality [7]. Nevertheless, other methods in caries diagnosis, beyond the traditional, have been developed: alternating current impedance spectroscopy technique (ACIST), computer-aided radiography (CAR), dental digital radiography (DDR), digital imaging fiber-optic transillumination (DIFOTI), diode laser fluorescence (DLF), electrical conductance fixed frequency (ECFF), endoscope filtered fluorescence (EFI), qualitative light-induced laser fluorescence (QLF), visualix high-definition imager and intra-oral sensor technology [8]. The most indicated therapeutic approach for the treatment of hidden caries is the removal of carious dentin, correct protection of the pulp-dentin complex and subsequent restoration of the dental element [9].

During the advanced phase of dental eruption, the fibrocellular follicle surrounding the permanent tooth maintains a connection with the lamina propria of the buccal membrane by means of a bundle of fibrous tissue containing remnants of the dental lamina known as a gubernacular cord [10]. This could enable a communication of the tooth with the oral environment, because, as the tooth erupts, its gubernacular canal is enlarged through osteoclastic activity. In the present report, the tooth was submucosal, without periodontal pocket or communication with the oral environment, hence the hypothesis of the possible development of a carious lesion. However, histopathological analyzes confirmed the absence of both gram-positive and gram-negative microorganisms in the dentinal tubules. Therefore, the possibility of hidden caries couldn't be applied.

The results found herein is in accordance with some studies that reported pulpal calcification, areas of osteodentin and absence of microorganisms [11,12]. However, areas of inflammatory infiltrate (lymphocytes and plasma cells) and osteoclasts (dentinoclasts) were found in the present report, and did not mention by Lenzi et al. [12]. The similarities between these case reports confirmed the diagnosis of coronary pre-eruptive reabsorption, due to the presence of areas of resorption and absence of microorganisms.

Considering the limitations of the cases described in the literature, the etiopathogenesis of these lesions is still little explored [1]. Understanding the etiological factors of coronary pre-eruptive resorption is a challenge. The clinical implication of the present report is that coronary resorption needs to be elucidated for an early diagnosis in order to benefit the patient with a suitable treatment avoiding further complications. The occurrence of these lesions in impacted teeth can be detected by complementary exams: x-rays and tomographies. Consequently, the professional should be aware of these occurrences in order to diagnose and propose the best treatment for each case.

CONCLUSION

Considering the presented case, the conclusive diagnosis about the origin of the lesion was confirmed only with the histopathological analysis. It was concluded that the radiolucent image refers to a pre-eruptive intracoronary resorption.

Collaborators

MM Sousa, AM Botelho, KTA Tavano, CAB Maciel, DW Douglas-de-Oliveira, ATM Mesquita, designed the study and acquired the data. ATMM performed histopathological analyses. All authors drafted the manuscript, have read and approved the final manuscript.

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Received on: 8/8/2022

Final version resubmitted on: 28/10/2022

Approved on: 15/12/2022

Assistant editor: Luciana Butini Oliveira