

**O diagnóstico da concrecência pode ser obtido apenas pelo exame clínico e
imaginológico? do caso clínico à histologia**

**Can concrecence diagnosis be obtained merely by clinical and imaging examination?
from clinical case to histology**

**¿Se puede obtener el diagnóstico de concrecencia solo mediante un examen clínico y de
imagen? del caso clínico a la histologia**

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Resumo

A concrecência é um tipo raro de união de dois dentes, sem predisposição para uma determinada etnia, gênero ou idade, especificamente unida por uma porção de cimento, sem a fusão da dentina, comumente relatada na região posterior da maxila, na maioria dos casos,

essa anomalia afeta os segundos e terceiros molares. Seu diagnóstico é sugerido por imagens radiográficas quando há proximidade entre dois dentes, sem sinais do ligamento periodontal ou osso interdental entre eles, mostrando frequentemente uma sobreposição radiográfica. A falta de atenção a esses sinais pode levar a complicações durante procedimentos endodônticos e cirúrgicos, como a extração não planejada dos dentes envolvidos, levando a problemas legais. O objetivo deste artigo é relatar um caso histologicamente comprovado de concrecência entre um segundo molar erupcionado comprometido em grande parte por cárie e um terceiro molar impactado, além de apresentar uma revisão da literatura, juntamente com o aspecto histológico, sobre o assunto.

Palavras-chave: Diagnóstico clínico; Diagnóstico bucal; Técnicas e procedimentos diagnósticos; Patologia bucal; Anormalidades dentárias.

Abstract

Concrescence is a rare type of union of two teeth, with no predisposition for a particular ethnicity, gender or age, specifically united by a portion of cementum, without the fusion of dentin, commonly reported in the posterior maxilla region, in most cases, this anomaly affects the second and third molars. Its diagnosis is suggested by radiographic images when there is proximity between two teeth, without signs of the periodontal ligament, or interdental bone between them, often showing a radiographic overlap. The lack of attention to these signs can lead to complications during endodontic and surgical procedures, such as unplanned extraction of the involved teeth, even leading to legal problems. The aim of this paper is to report a histologically proven case of concrescence between an erupted second molar largely compromised by caries and an impacted third molar, in addition to presenting a literature review, along with the histological aspect, about the subject.

Keywords: Clinical diagnosis; Oral diagnosis; Diagnostic techniques and procedures; Oral pathology; Tooth abnormalities.

Resumen

La concrecencia es un tipo raro de unión de dos dientes, sin predisposición a una determinada etnia, género o edad, unida específicamente por una porción de cemento, sin fusión de dentina, comúnmente informada en la región del maxilar posterior, en la mayoría de los casos, esta anomalía afecta los segundos y terceros molares. Su diagnóstico es sugerido por imágenes radiográficas cuando hay proximidad entre dos dientes, sin signos del ligamento periodontal o hueso interdental entre ellos, a menudo mostrando una superposición

radiográfica. La falta de atención a estos signos puede conducir a complicaciones durante los procedimientos endodóncicos y quirúrgicos, como la extracción no planificada de los dientes involucrados, lo que lleva a problemas legales. El propósito de este artículo es informar un caso de concrescencia comprobado histológicamente entre un segundo molar erupcionado afectado en gran medida por caries y un tercer molar impactado, además de presentar una revisión de la literatura, junto con el aspecto histológico, sobre el tema.

Palabras clave: Diagnóstico clínico; Diagnóstico bucal; Técnicas y procedimientos diagnósticos; Patología bucal; Anomalías dentarias.

1. Introduction

Concrescence is a rare developmental dental alteration, which may be influenced by environmental factors in its etiology, such as trauma, infections, inflammatory reactions, among others (Neville, Damm, Allen & Chi, 2016 and Sugiyama et al. 2007). However, its etiology is still not fully understood (Syed, Alluri, Mallela & Frazee, 2016 and Romito, 2004). Its development can occur in two different stages: first during root formation, being classified as true concrescence, and after complete root formation, being denominated as acquired concrescence (Gunduz, Sumer, Sumer & Gunhan, 2006).

Recent studies have shown no predisposition for a particular ethnicity, age or gender (Syed et al. 2016 and Kardach, Sobieszczyk & Sokalski, 2016). And the incidence of concrescence in extracted teeth is 0.8% in permanent teeth and 0.2-4% in the deciduous dentition (Syed et al. 2016 and Foran, Komabayashi & Lin, 2012). The concrescence was describe as the union of two adjacent teeth by a cementum layer, which is usually deposited among the roots, without the confluence of dentin; therefore, they are two independent teeth, regarding the crowns, roots and pulpal canals (Syed et al. 2016 and Gunduz et al. 2006). In this case, the main binding agent is the cementum, one of the tooth's supporting tissues (Romito. 2004). Its wet weight is comprised of 65%, 23% and 12% of inorganic material, organic material, and water, respectively. As for volume, the inorganic material, organic material and water correspond to approximately 45%, 33%, and 22%, respectively (Berkovitz, Holland & Moxham, 2004).

The main mineral compound is hydroxyapatite, and the main organic component is the type I collagen fibers. As for its dynamics, this is known to be deposited by the cementoblasts throughout life, slowly and irregularly, and their thickness can triple during life. Cementum is a tissue where the fibers of the periodontal ligament are inserted and also has the characteristic of

tissue repair, suggesting that this characteristic may be responsible for other dental alterations involving the cementum (Berkovitz et al, 2004).

Concrescence predominantly occurs in the posterior maxilla (Khanna, Sandhu, Bansal & Khanna, 2011). In most cases, such an anomaly affects the second and third molars (Kardach et al, 2016). The diagnosis of concrescence is somewhat sensitive, being clinically impossible to be determined because most of the time it is related to impacted teeth (Romito, 2004). The conventional radiographs, such as periapical and panoramic radiographs, provide radiographic signs suggestive of concrescence, such as overlap or juxtaposition of teeth, absence of interdental bone and space from the periodontal ligament (Khanna et al. 2011). However, these radiographs have many overlaps and are limited by the two dimensions, distorting key points, and may have undesirable consequences during certain types of treatments, such as endodontic and mainly surgical treatment (Syed et al. 2016).

The importance of Cone Beam Computed Tomography (CBCT) scans in these cases, are emphasize, where they are of great assistance in a presumptive diagnosis, providing the Dentist with a three-dimensional visualization of the region, a more cautious approach and a more realistic planning of the procedure to be performed (Syed et al. 2016).

However, it is important to note that the final diagnosis is only confirmed by histological exams, showing the union of neighboring teeth by the cementum, thus excluding other possible pathologies (Romito. 2004). In view of these considerations and the importance of reporting and discussing this subject, the objective of this paper is to describe a case of dental concrescence, in order to discuss the mechanisms and histological structures of this alteration and present a literature review on the subject.

2. Methodology

The work in question addresses a case report in a qualitative and descriptive way, aiming to detail the extraction of a dental alteration and its diagnostic process, in addition to offering a narrative review on concrescence.

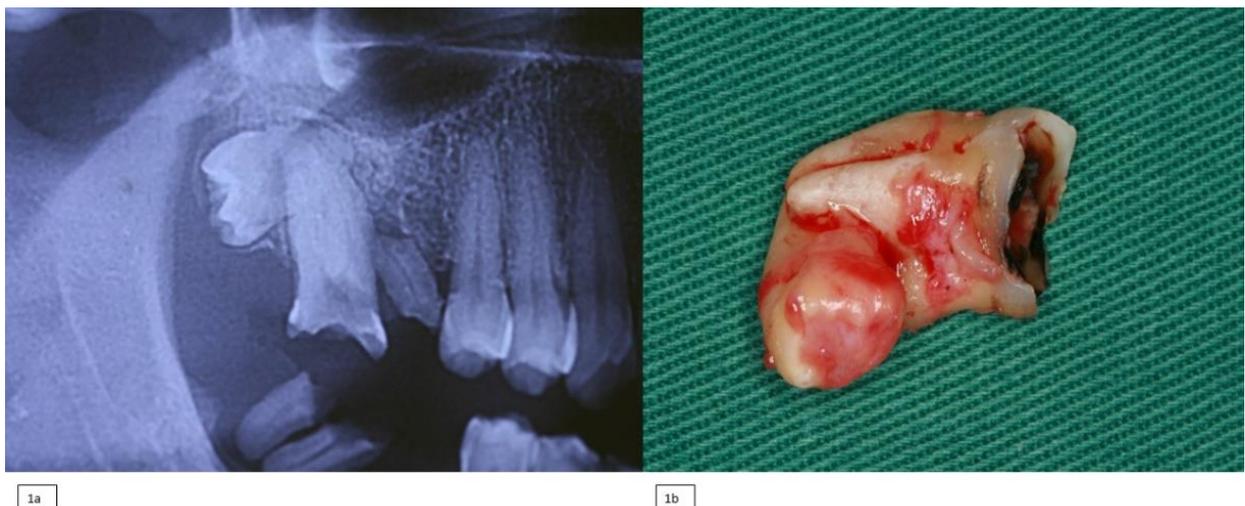
3. Case Report

A 56-year-old female patient, attended the Dental Clinic of the State University of Maringá (UEM) complaining of pain in the right second molar (17). No mucosal abnormality was noted on intraoral examination. In the clinical assessment, it was observed that the crown

of tooth 17 was largely destroyed by caries, and the right third molar (18) was not visualized; caries was also observed in other teeth with important loss of structure and indication of removal. An analysis of the panoramic radiograph (Figure 1a) revealed the proximity of teeth 17 and 18, but tooth 18 did not erupt. From this point, the extraction of the teeth 17 and 18 was planned in a single surgical time, in addition to the other indicated teeth. The treatment was explained to the patient and consent was obtained.

During the surgery, an alveolectomy was performed, aiming at the lowest possible trauma to the surrounding tissues, with the use of extractors. When the tooth 17 was removed, could be observed that it was avulsed together and that there was a union of the roots (Figure 1b). The teeth 17 and 18 were collected for studies, and the patient received all the care and post-surgical guidance. Given the occasion, the hypothesis of concrescence was included.

Figure 1a: Pre-surgical panoramic radiography, overlapping of teeth 17 and 18, right posterior superior portion. **Figure 1b:** Teeth 17 and 18 united after the extraction.



Source: Personal archive.

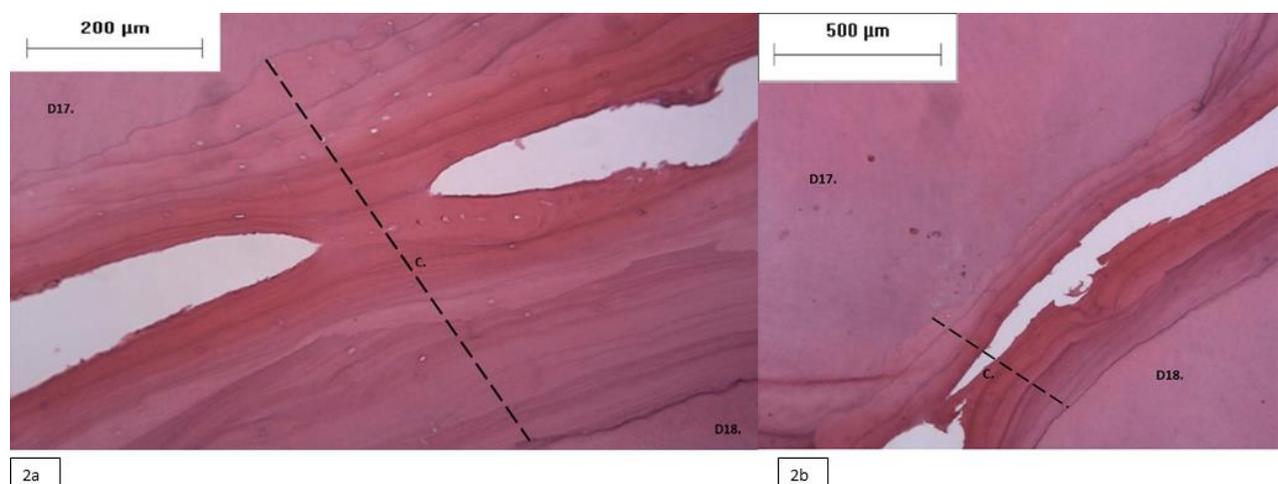
Figure 1 shows the panoramic radiograph in A, showing the proximity between teeth 17 and 18, but tooth 18 did not erupt; in B, the aspect of the dental element is noted after extraction.

From the results of the macroscopic assessment, we observed that the teeth remained united even after decalcification, but the crown region was completely decalcified. Microscopically, the material that kept the two roots together was a large cementum layer (Figure 2a), structured by the cellular part, with the presence of cementocytes or gaps, arising

from the histological process where the loss of these cells occurs, and by the acellular part, composed basically of inorganic matter, corresponding to all the tissue characteristics.

With the histological examination (Bancroft & Stevens. 1996), the portion of the dentin of each tooth was visible, without confluence at any moment. Through hematoxylin and eosin staining, it was possible to see the structural discrepancy in the union, with areas of largely irregular deposition (Figure 2b).

Figure 2a: Photomicrograph of the histological section with HE staining. Thick cementum layer (c.) uniting teeth 17 (D17-dentin) and 18 (D18-dentin). 10x magnification. **Figure 2b:** Photomicrograph of the histological section with HE staining. Irregular cementum arrangement (C.) between teeth 17 (D17-dentin) and 18 (D18-dentin). 4x magnification.



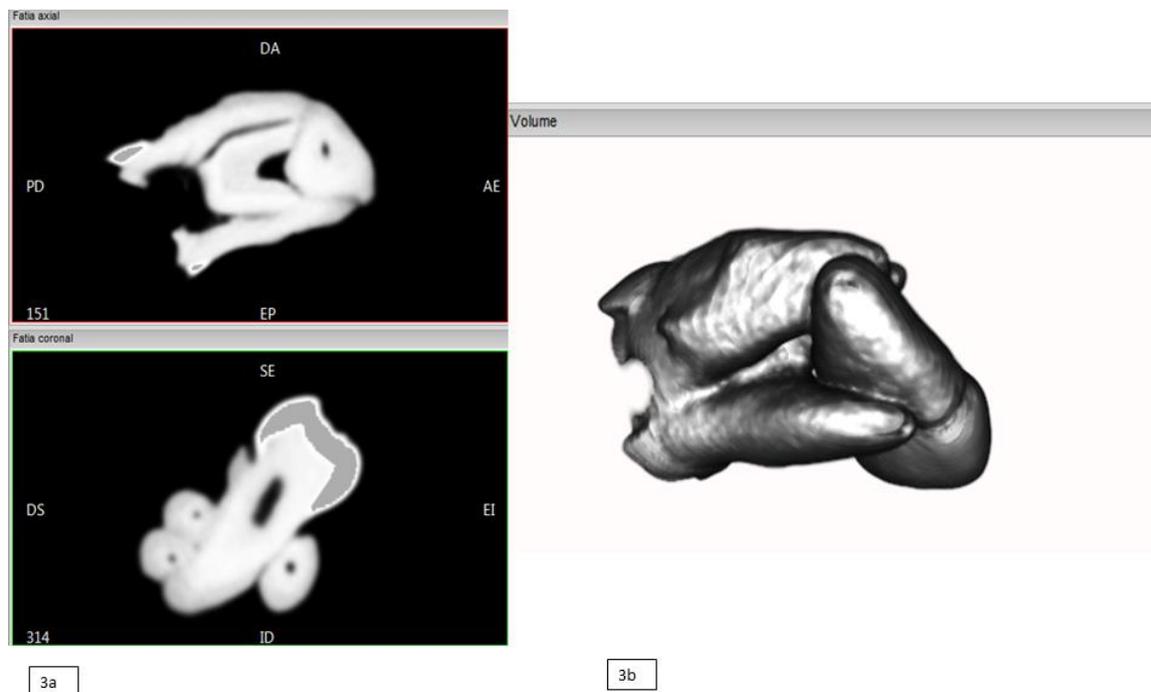
Source: Personal archives.

Figure 2 shows in A the photomicrograph of the histological section with HE staining. Thick cementum layer (c.) uniting teeth 17 (D17-dentin) and 18 (D18-dentin). Figure 2B shows the Photomicrograph of the histological section with HE staining. Irregular cementum arrangement (C.) between teeth 17 (D17-dentin) and 18 (D18-dentin). 4x magnification.

The specimen were scanned on the i-CAT Next Generation (Imaging Sciences International, Hatfield, PA, USA) device, with a reconstruction volume at 0.125 mm isometric voxel, FOV (Field of View) of 8 X 8 cm, 120 kVp tube voltage and 3-8 mA tube current, in DICOM format. This equipment is installed in the Complex of Research Support Centers (COMCAP), CTS - Central of Technology in Health, Laboratory of Image in Clinical Research (LIPC). The cone beam computed tomography, showed to differentiate the relation among the channels of the teeth that were independent and the juxtaposed union of the roots. In addition to

allowing the 3D reconstruction of the sample, assessing root angulations, the relation of apices and the like (Figure 3a and 3b).

Figure 3a: Cone-beam computed tomography. Axial, coronal sections of the sample evidencing the relation between the roots of teeth 17 and 18. Figure 3b: 3D reconstruction of the sample evidencing the relation between the roots of teeth 17 and 18.



Source: Personal archives.

Figure 3 in A shows cone-beam computed tomography. Axial, coronal sections of the sample evidencing the relation between the roots of teeth 17 and 18. In B shows 3D reconstruction of the sample evidencing the relation between the roots of teeth 17 and 18.

4. Discussion

With the histological examination, it was possible to evidence the union of the teeth without the fusion of dentin, differentiating it from other types of dental anomalies, such as gemination or fusion (Gunduz et al. 2006). In addition, it allowed the differentiation of the tissue that united the two elements (cementum), in which it was possible to evidence the different degrees of deposition, corresponding to the flow of irregular tissue deposition, which is characteristic due to the position of the histological section and the dental anatomy, as reported by Berkovitz et al. (2004)

Although this tissue has been extensively studied, it remains one of the least known tissues. It is known that cementum is a tissue that plays the role of adjacent tissue repair, increasing the production of reactive cementum in areas with inflammation, such as teeth with a history of chronic periapical inflammation, which have a substantial formation of cementum, giving rise to hypercementosis (Sugiyama et al. 2007 and Berkovitz et al. 2004). Taking this into account, it is assumed that such relation of tissue repair, combined with local inflammation, concomitant with the higher amount of cementum physiologically deposited in the apical areas and in the areas of multi-root tooth furcation, may be the cause of concrescence in this case. In the present case, the location of the concrescence in the posterior region of the maxilla supported the predispositions presented by other authors (Syed et al. 2016; Gunduz et al. 2006; Kardach et al. 2016; Foran et al. 2012; Khanna et al. 2011), as well as the relation of greater involvement between the second and third molars (Syed et al. 2016; Gunduz et al. 2006; Kardach et al. 2016).

The teeth were also submitted to imaging after extraction, the cone-beam computed tomography was able to differentiate the relation among the teeth channels that were independent and the juxtaposed union of the two roots. It is important to emphasize the relevance that this type of examination would have prior to planning, especially in cases where teeth maintenance can be listed (Syed et al. 2016), thus avoiding legal problems arising from accidents and complications not previously listed and explained to the patient (Kardach et al. 2016). Unlike some authors, it was not possible to confirm the presence of the cementum layer through CBCT, thus requiring a complementary examination (histopathological examination in this case) for the final diagnosis of the case, reaffirming the importance of this examination (Sugiyama et al. 2007; Romito. 2004; Gunduz et al. 2006). The concrescence is a dental alteration that does not have diagnosis of malignancy, this may be the reason why a proper assessment to diagnose such alteration is not a routine. Since we are in a teaching institution where we have the facility to perform the assessments at no additional cost to the patients, this raised the discussion of the true necessity of this assessment in cases in which the patients are treated in private offices or places that do not have such facility.

5. Final Considerations

In order to definitively diagnose concrescence, we conclude that these complementary exams are necessary. Thus, after clinical, image and histological analysis of our case, we can conclude that the term “concrecence” should be used only after a histological evaluation of

the fused teeth. In clinical practice, we suggest using the term "dental fusion". Histology and the etiology of concrescence are still rarely addressed in the literature, thus being a rich field for new studies and research that better elucidate their aspects and characteristics.

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