Internal Root Resorption - Report of a clinical case

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Abstract

Internal resorption represents an inflammatory pulpopathy developed after pulpal aggression, with consequent focal necrosis of odontoblasts associated with a chronic inflammatory condition, but without loss of pulp vitality. In order for internal resorption to occur, a chronic pulpal inflammatory process is needed and, therefore, the pulp cannot evolve into necrosis. Its etiology is related to trauma, cavities, chronic pulpitis and deep restorations. As it has no symptoms, it is diagnosed through routine radiographic examinations, where we observe that the contour of the pulp boundaries undergoes a relatively symmetrical expansion, giving rise to a radiolucent image with a ballooning aspect and regular contours. The present article reports a case of internal root resorption involving the root of a left upper incisor tooth. Endodontic treatment was performed in two sessions, with the use of intracanal calcium hydroxide medication, conventional obturation of the apical third with gutta-percha, filling of the resorptive cavity with Bio-C Repair (Angelus, Londrina, Brazil) and resin restoration. With the treatment performed, a good clinical result was obtained, allowing the tooth to be kept in the alveolus.

Introduction

Root resorption is the loss of hard dental tissues as a result of activities of clastic cells (Patel 2007; Patel et al., 2010). It can be a physiological or pathological phenomenon. The root resorption in the primary dentition is a normal physiological process, except when the resorption occurs prematurely (Bille et al., 2007; Batel et al., 2008; Patel et al., 2010), while pathological resorptions are not observed naturally in any stage of the individual's life. According to the affected dental surface, it can be classified into internal resorptions, when they begin in the walls of the pulp cavity; external when they begin on the external root surface; and internal-external when the resorptive process is established in the internal and external root surfaces, leading to the communication between the areas of resorption. Generally, in cases of internal-external resorption it is not possible to identify in which dental surface the process began (Consolaro 2012; Lopes & Siqueira Jr. 2010).

Internal resorption is considered to be a pulpopathy of inflammatory nature, whose process generates a chronic response to the pulp tissue (Patel et al., 2010). The pathology originates in the interior of the pulp chamber or in the root canal and is characterized by the destruction of the dentin that begins in the pulp in a dentin wall, progressing in the internal-external direction. It occurs inside the pulp cavity in a centrifugal way towards the outer surface of the crown or root (Ferreira et al., 2007). With the evolution of the disease, perforation of the wall of the root canal may occur, leading to a communication of the dental pulp with the periodontium. Radiographically, this pathology is characterized by a uniformly visible radiolucent enlargement in the root canal, with a relatively symmetrical expansion of ballooning aspect and regular contours (Consolaro 2012; Cohen & Hargreaves 2011).

In physiological conditions, the pulp wall is protected from the action of the clasts by the odontoblasts and pre-dentin layers, which prevent them from contacting the mineralized dentin. Odontoclasts are multinucleated cells that attach only to mineralized tissues, destroying them if they are able to. In order for internal root resorption to occur, the external protection of the odontoblast layer and the pre-dentin of the root canal wall must be damaged, resulting in exposure of the mineralized dentin underlying the odontoclasts (Trope 1998; Patel et al., 2010).

There are several factors that cause internal

resorption including trauma, dental caries, deep restorations and chronic pulpitis (Lopes & Siqueira Jr. 2010; Patel et al., 2010). In trauma, the displacement of odontoblasts occurs, exposing the mineralized dentin to the action of odontoclasts (Ferreira et al., 2007). When the dentin surface is exposed, the clasts adhere firmly due to the action of their brush border by creating a microenvironment between the clast and the mineralized surface, triggering the resorption process (Ferreira et al., 2006). In chronic pulpitis associated with caries and deep restorations, part of the odontoblastic layer is absent, exposing the mineralized dentin directly to the pulpal connective tissue. In these situations, these areas of dentin exposure may be the initial point of internal resorption (Consolaro 2012; Ferreira et al. 2007; Cohen & Hargreaves, 2011).

Henemann et. al. (2003) studied the prevalence of internal root resorption in permanent teeth and its location in the pulp cavity, using a radiographic file with one hundred and fifteen radiographs containing this pathology. The results showed that the highest prevalence occurred in the upper incisors and the middle third of the root canal was the most common location. Also, a significant number of cases with perforation were observed. This result may be associated with a greater presence of trauma in this region than in other areas, since the etiological factor related to trauma is the most prominent one.

The diagnosis of pulpal changes requires a systematic approach of the patient including clinical examination, anamnesis and complementary examinations. From the interaction between these factors it is possible to identify the disease and, thus, to establish the treatment plan. Early diagnosis of internal root resorption is essential to achieve treatment success.

In the initial stage, conventional X-ray is not efficient to diagnose root resorptions (Prata et al., 2002). It is very important to do a good periapical radiography; and when possible, request a cone beam computed tomography (CBCT) to confirm the diagnosis and to evaluate whether the internal resorption is communicating or not.

Internal resorptions may be located in the radicular or coronary portion of the tooth. When present in the crown, internal reabsorption gradually approaches the enamel and, through transparency, the presence of a pink or reddish point or area, a pathognomonic sign of this pathology, is evident (Consolaro 2012; Cohen & Hargreaves, 2011).

In the treatment of cases of internal root resorption, the Endodontist must perform a rigorous chemical-mechanical preparation, seeking physically and chemically to reach all walls of the resorption. After cleansing and modeling, both the canal and the resorbing cavity must be filled three-dimensionally to prevent bacterial recontamination.

The objective of this study is to report a clinical case of internal root resorption without periodontal communication involving the upper left incisor, demonstrating that it is possible to obtain a good clinical result from an early diagnosis and an appropriate treatment, allowing the tooth to be maintained in the alveolus.

Clinical case

A 44-year-old female patient came to the practice to have endodontic treatment of tooth 22. We performed the initial radiography to evaluate tooth 22 and came across a radiolucent balloon image, characterizing an internal root resorption in tooth 21. We then performed a new radiograph to evaluate tooth 21 (FIGURE 1).

FIGURE 1 - Initial radiograph

During anamnesis, the patient reported having suffered a butt from her son two years ago. Clinical examination revealed the presence of a porcelain veneer on tooth 21, positive pulp sensitivity test, absence of symptomatology and absence of alterations in the gingival mucosa. We asked for a cone beam computed tomography (FIGURES 2, 3 and 4) to confirm the diagnosis, to evaluate whether the resorption was communicating or not, and to study the remaining tooth structure.

FIGURE 2 - Tomographic image - coronal section

FIGURE 3 - Tomographic imaging - axial section

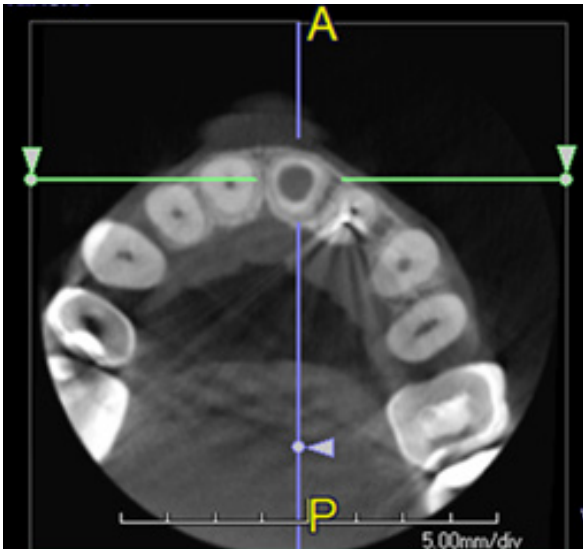


FIGURE 4 - Tomographic image - sagittal cut

The use of CBCT can be invaluable in the decision-making process. The scanned data provide the clinician with a three-dimensional appreciation of the tooth; the extent and location of reabsorption; the adjacent anatomy; the presence or absence of root perforations and allows us to evaluate if the lesion is amenable to treatment (Tyndall 2008; Patel et al., 2010).

After the clinical, radiographic and tomographic analysis, internal root resorption without external communication was diagnosed, which makes the prognosis more favorable.

After the access, the canal was irrigated with 5% Sodium Hypochlorite followed by 17% EDTA, both with PUI and Easy clean. Through the use of an operating microscope, it was possible to visualize the extent of the resorptive cavity (FIGURE 5). During the chemical-mechanical preparation, we did an abundant irrigation with auxiliary chemical substances with effective organic solvent capacity and spherical ultrasonic tip to remove and dilute the remaining pulp tissue.

FIGURE 5 - Resorptive cavity

Due to the inaccessibility of internal root resorption walls, debridement, chemical-mechanical preparation and ultrasonic activation of irrigators should be seen as an essential step in disinfecting the internal resorption defect. However, even with the use of ultrasonic instruments, bacteria, in infected cases, can remain in confined areas. Thus, an intracanal antibacterial drug should be used to improve the disinfection of inaccessible walls (Burleson et al., 2007; Patel et al., 2010).

The canal was then filled with a calcium hydroxide PA (pro-analysis) paste with physiological saline (FIGURE 6) to chemically cauterize the tissue, which might still be present in the cavity, and to promote the necrosis of all bone remodeling units due to its high pH and alkalinization of the medium, thus ceasing the clastic activity.

FIGURE 6 - Intracanal medication

In the second session, 15 days later, we performed conventional obturation of the apical third of the canal with gutta-percha, filling the reabsorbing cavity with Bio-C Repair (Angelus, Londrina - Brazil) (FIGURE 7, 8 and 9), condensing it against the walls with specific condensers and moistened cotton ball and made the coronary sealing with resin.

Bio-C Repair is a ready-to-use bioceramic repair cement. It is made of calcium silicate, calcium aluminate, calcium oxide, zirconium oxide, iron oxide, silicon dioxide and dispersing agent. Bio-C Repair presents superior features of marginal adaptation, biocompatibility, excellent radiopacity and sealing ability in humid environments. Besides these characteristics, it has as a great advantage its ease of insertion into the resorptive cavity.

FIGURE 7 - Bio-C Repair (Angelus, Londrina - Brazil).

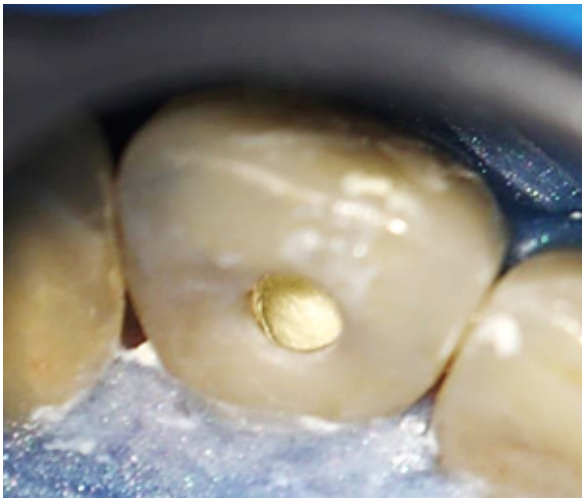
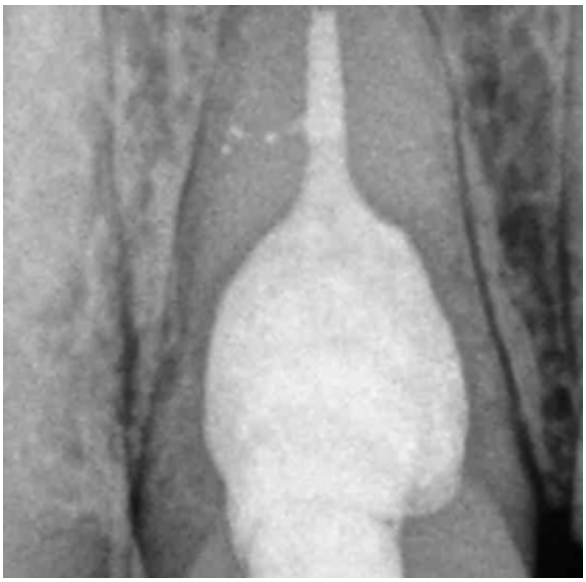


FIGURE 8 - Final radiography

FIGURE 9 - Resorptive cavity filled with Bio-C Repair



Conclusion

It is very important to carry out good anamnesis, clinical and complementary exams. The earlier the diagnosis of internal root resorption, the better the prognosis, reducing the risk of fragility of the dental structure. It is possible to obtain a good clinical result from an early diagnosis and an appropriate treatment, allowing the maintenance of the tooth in the alveolus.

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