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Regression of chronic apical periodontitis after six months of control

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ABSTRACT
This study aims to describe the repair through a clinical case of an extensive periapical lesion with a diagnosis suggestive of chronic apical periodontitis. A 28-year-old female patient was referred to the Integrated Clinic III of the Pernambuco School of Dentistry for endodontic treatment of tooth 11. Cervical and middle canal preparation was performed with manual instruments using the Crown Down technique. %. Electronic odontometry was performed with the apical locator (Romiapex® and confirmed by radiographic odontometry. Apical preparation was done with a third-grade file and root canal filling was performed using the rolled cone technique, associated with the active lateral condensation technique and Bio-C Sealer bioceramic endodontic cement. It was verified by radiographic images in the treatment performed, that during the consultations there was a significant reduction in the periapic lesion six months after the root canal filling. It is concluded that conservative endodontic treatment is capable of determining the success of the therapy.

Keywords: Endodontics, Periapical diseases, Root canal treatment.

INTRODUCTION

Endodontics prevents and treats pathological occurrences in the pulp and periradicular lesions (Siqueira Jr, 2020). This specialty has been increasingly consolidating itself as one of the most relevant in Dentistry, playing a strong role in promoting the patient's oral and general health, as it treats periradicular lesions, one of the most common infectious diseases that affect humans. Different forms of endodontic treatment have promoted the predictability of results in the rescue and health of teeth (Lopes; Siqueira Jr, 2020).

Endodontic treatment if performed correctly has significant results, however, there may be failures causing the recurrence of the initial clinical symptoms. In cases of failure of endodontic treatment, the most used medication is calcium hydroxide to fight bacteria that cause pathologies, however, when used alone it may not be able to eliminate *Enterococcus faecalis.* The authors highlighted the importance of associating active vehicles with calcium hydroxide, such as: saline solution, distilled water, PMCC, anesthetics, chlorhexidine and propylene glycol. Thus, even though the success rate of endodontic treatments is high, failures occur in a significant number of cases that are usually associated with the persistence of bacteria in root canals. (Damascena et al. 2024)

All the technical-scientific development of the instruments and filling materials used in endodontic treatment, as well as the expansion of knowledge of the anatomy of the root canal system over the years, allows the stages of endodontic treatment to be carried out with greater precision, efficacy, safety, and in a shorter time, even following controversial opinions regarding endodontic treatment protocols in a single section. To professionals who practice Endodontics, scientifically proven clinical conducts are supports so that the protocols can be inserted into the clinical experience, providing the patient with an increasingly resolute and successful treatment.

Penetration of periapical tissue by bacterial cells contributes to the development of periapical lesion. Pathogens located in the apical portion of the canal are in favorable conditions for their development and consequently cause damage to the host. Bacterial products or components can directly or indirectly activate the host's immune system, leading to inflammation of the periapical tissues. The inflammatory event itself results in a hostile environment, with an exacerbation of the local immune response, in an attempt to contain the invasion of microorganisms (SIgnor et al, 2021).

Many aspects are associated with the failure of endodontic treatment, whether due to microbiological causes, failures in the technique and failures in sealing.

Adequate follow-up of the therapeutic approach, the initial radiographic record, the immediate aspect and the final aspect through these radiographic records are indispensable. The case discussed above in this monograph addresses the treatment of a persistent periapical lesion through conventional non-surgical endodontic retreatment associated with intracanal medication based on calcium hydroxide. From the clinical and radiographic follow-up, the remission of the lesion and the

effectiveness of the retreatment in the therapeutic success were verified. (Travassos et al. 2021). A basic treatment plan should be carried out after the anamnesis and confirmation of the diagnosis, with the aim of eliminating the pathological process of the dento-alveolar fistula. However, each case should be analyzed exclusively, since the lesion should not be treated, ignoring the related etiological factors. Therefore, based on the correct diagnosis with radiographic examinations and screening tests, associated with canal cleaning systems in a uniform and efficient manner, introducing medication and radiographic follow-up, it is possible to achieve success in endodontic treatment. (Elo et al. 2022)

Therefore, the objective of the present article is to describe a clinical case of an extensive periapical lesion treated by a non-surgical endodontic approach, with significant periapical repair.

A 28-year-old female patient was referred to the Integrated Clinic III of the Pernambuco School of Dentistry for endodontic treatment of tooth 11. Clinically, the patient was symptomatic, with a negative response to the cold pulp sensitivity test performed with Endofrost -50°C refrigerant gas (Roeko, Langenau, Germany), and a negative response to the vertical percussion tests. Periapical radiographic examination showed extensive periapical bone radiotransparency (Figure 1).

Figure 1- Extensive periapical bone radiotransparency



The present clinical case report refers to a descriptive and qualitative study, in which the conservative treatment of an extensive periapical lesion is observed. Regarding the ethical terms, the patient signed the Informed Consent Form and the ethical principles described in the Declaration of Helsinki were respected.

Based on clinical findings and imaging tests, the diagnosis of apical periodontitis was established. . The treatment was authorized through the free and informed consent form (ICF). The therapeutic modality for the case was conventional endodontic treatment. After local infiltrative anesthesia with 2% lidocaine anesthetic solution with epinephrine 1:100,000 (DFL Indústria e Comércio S.A., Rio de Janeiro, RJ), absolute isolation and coronary opening were performed. Cervical and middle preparation of the root canal was performed with manual instruments using the

Crown Down technique with K-File Denstply Maillefer, Ballaigues - Switzerland third series files (140-130-120-100-90) until reaching the provisional length of the tooth in the TLC. At each instrument change, irrigation was performed with 2.5% Sodium Hypochlorite. Electronic dentistry was performed using the apical locator (Romiapex®, Romidan, Kiryat Ono, Israel) with a Kerr 90 file (Denstply Maillefer, Ballaigues - Switzerland), establishing the actual working length (CRT) of 24 mm and actual tooth length (CRD) of 25 mm.

Foraminal debridement was performed with an instrument 60 at the actual length of the tooth, and due to the diameter of the root apex, manual instrumentation was chosen up to the K-File file number 130. Subsequently, the irrigation protocol activated with the Easy Clean plastic file (Easy Equipamentos Odontológicos, Belo Horizonte, Brazil) was instituted, as follows: 3 cycles of 20 seconds of 2.5% Sodium Hypochlorite followed by 3 cycles of 20 seconds of 17% EDTA (Biodinâmica, Ibiporã, Brazil), finished with 3 cycles of 20 seconds of 2.5% Sodium Hypochlorite.

After drying the channel with sterile absorbent paper tips, intracanal medication based on calcium hydroxide (UltraCal® XS) was placed for a period of 30 days and the temporary sealing with glass ionomer cement (Vitro Fil – DFL®).

The root canal filling was performed using the rolled cone technique, associated with the active lateral condensation technique and Bio-C Sealer bioceramic endodontic cement (Angelus, Paraná, Brazil). On radiography, endodontic cement extravasation was observed, due to the presence of cementary resorption. (Figure 2)

Figure 2 – Root canal filling with endodontic cement extravasation



Coronary sealing with definitive tooth restoration was performed with A3 dentin composite resin, A2 enamel (3M-ESPE®, St. Paul, MN, EE. UU) (Figure 3). At the 6-month follow-up, the patient reported absence of signs and symptoms, and radiographic examination revealed a significant reduction in the periapical lesion, in addition to the resorption of the extravasated cement (Figure 3).

Figure 3 - Significant reduction of periapical lesion and resorption of extravasated cement



DISCUSSION

The success of endodontic treatment depends on the adequate disinfection of the root canal system and subsequent hermetic filling, ensuring the extinction of microorganisms, as their persistence is one of the factors for an unfavorable prognosis and the need for a new endodontic intervention, which will allow the improvement of the previous failed treatment. (Saldanha, 2024). Thus, it is important to emphasize the importance of obtaining a good clinical examination, evaluating not only the patient's oral health but also their general physical state. The dentist must be able to provide the diagnosis and the best possible treatment, paying attention to the root canal disinfection measures and ensuring a reduction in the microbiota present. (Travassos et al. 2023). Corroborating with surgery (Travassos *et al*., 2021) who report with great propriety that the success of the treatment will depend on the maximum possible disinfection of the root canals. Radiographic follow-up should be performed during medication changes, in order to verify the absence of infection; and after treatment, for a minimum period of two years, in order to observe the regression of the
lesion.

Radiographically it was possible to observe the presence of root resorption at the apex of tooth 11, this characteristic makes it difficult to determine the working length reliably by means of periapical radiography. Knowing that odontometry is an elementary step for successful endodontic treatment, this step can be performed radiographically and/or with an electronic foraminal locator, the latter being more reliable. With these favorable conditions, an electronic foraminal locator was used to determine the working length. In this study, we report the case of a patient who presented with enlargement of the periodontal ligament space and extensive periapical lesion. After endodontic treatment, it was possible to observe the beginning of the repair of this lesion 6 months after the

conclusion of endodontic therapy, which confirms that the application of intracanal medication based on calcium hydroxide helps to control the infection. (Travassos et al. 2024).

The use of calcium hydroxide as a medication in cases of teeth with periapical lesions demonstrates advantages due to the antimicrobial action in the root canal system, thus complementing the action of biomechanical preparation and enabling the proper repair of periapical tissues, obtaining action on remaining microorganisms. In addition, this intracanal drug has biological properties such as biocompatibility and inactivation of bacterial endotoxin (HORI et al, 2011). In this case, due to the size of the lesion, intracanal medication was preferred for a period of 30 days. The filling material of choice was Bio-C Sealer bioceramic endodontic cement, as it has excellent attributes such as bioactivity, referring to the ability to form hydroxyapatite during the setting process, resulting in a bond between the dentin and the filling material, which provides a better hermetic seal in the canal filling process (Sousa, Salomão, 2020; Gama, Salomão, 2021).

The filling technique or the filling cement can have repercussions on the quality of sealing and repair of periapical lesions. Based on the above, the clinical case used the technique of active lateral condensation, so that the sealing occurred correctly in the feeling apical lateral and coronary and bioceramic Bio-C Sealer was the cement of choice, due to its excellent biological and physicochemical properties. (Lopes and Siqueira Jr., 2010).

In the 6-month follow-up visit, the success of the treatment was proven, in which the patient was asymptomatic and the significant improvement in tissue repair and bone neoformation. The patient did not return to the follow-up visit one year after the root canal system was filled. More conservative approaches should be the professional's first choice even in complex cases, such as the one presented. The correct diagnosis is essential for the choice of the best conduct and the establishment of the correct treatment.

CONCLUSION

Conventional endodontic treatment performed within the technical standards is sufficient to determine the success of the therapy, allowing periapical bone neoformation, through effective cleaning and disinfection, use of intracanal medication based on calcium hydroxide, and hermetic filling of the root canal system.

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