LUMEN ET VIRTUS

Repair of a periapical lesion with characteristics of a periapical cyst

https://doi.org/10.56238/levv15n39-179

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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 periapical cyst. A 33-year-old female patient was referred to a private practice for endodontic treatment of tooth 11. Clinically, the patient was asymptomatic, with a negative response to the cold pulp sensitivity test, and no pain to vertical and horizontal percussion. Periapical radiographic examination showed extensive periapical bone radiotransparency suggestive of a periapical cyst. Treatment was initiated with coronary opening, root canal exploration, and root canal preparation using the modified Oregon apex crown preparation technique, associated with 2.5% sodium hypochlorite as an irrigating solution. Calcium hydroxide paste was applied as an intracanal medication for a period of 30 days and the coronary access was sealed with glass ionomer. In the following session, after verifying the absence of clinical signs and symptoms, it was decided to fill the root canal system using the active lateral condensation technique associated with Bio-C

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Sealer bioceramic endodontic cement. After the 24-month preservation period, tissue repair and bone neoformation of the area were observed, as well as the absence of clinical signs. It is concluded that conservative endodontic treatment is capable of determining the success of the therapy.

Keywords: Endodontics, Periapical diseases, Root canal treatment.

INTRODUCTION

A long-term pulp infection allows bacteria to propagate to the entire root canal system, in addition to the root canal lumen and dentin tubules, the lateral, secondary, and accessory canals; apical delta; gaps formed by cementary resorptions protected by biofilmbacteria and the periapical region. This information emphasizes the need for bacterial elimination from the canal system, which is not achieved in cases of teeth with long-term periapical lesions, only with biomechanical preparation, as it would be impossible to eradicate the entire infection without the complementary help of a topical medication between sessions (Travassos et al, 2022). The authors also report that proper filling of the canal has a profound impact on the effectiveness of endodontic therapy. This filling must be performed precisely, in order to hermetically seal the root canal, preventing the entry of microorganisms. However, its importance goes beyond that. An adequate filling is also capable of promoting an environment conducive to tissue repair in the periapical region, allowing tissues to restore themselves naturally and preventing the recurrence of infections.

Treatment must follow an appropriate clinical decontamination protocol, in order to cure the patient's signs and symptoms, with regression of periapical lesions (Regezi, Sciubba, 2020). To remedy the infectious process associated with the root canal and the periapical region, it is necessary to reduce the bacterial microbiota in these places as much as possible. Thus, the use of a powerful irrigating solution with antimicrobial properties is recommended. Sodium hypochlorite is recommended as the main irrigant, since it has a broad spectrum of action and tissue dissolution capacity. In addition to these favorable properties, the activation of the irrigating solution enhances the decontamination process of the root canal system.

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 support so that the protocols can be inserted into the clinical experience, providing the patient with an increasingly resolute and successful treatment (Gonçalves et al. 2000).

The indicated treatment is the decontamination of the root canal system through the use of chemical substances, preparation and modeling of the root canal and mechanical activation, in order to remove the necrotic pulp tissue and also by the insertion of intracanal medication. After the reduction of regional inflammation, there is a stoppage in the growth of the lesion, then the repair process begins, with new bone formation and disappearance of clinical signs. Periapical repair is an important indicator of the success of endodontic treatment, which is monitored by means of clinical and radiographic examination. An accurate diagnosis, associated with appropriate endodontic

treatment, can avoid unnecessary surgical intervention and enable great chances of a favorable prognosis in the long term. (Oliveira et al, 2018). For Travassos et al (2021), the adequate follow-up of the therapeutic conduct, the initial radiographic record, the immediate aspect and the final aspect through these radiographic records is indispensable. The objective of this study was to verify the process of periapical tissue repair, through a clinical case, after non-surgical endodontic treatment.

CASE REPORT

The present clinical case report refers to a descriptive and qualitative study, in which the conservative treatment of an extensive periapical lesion suggestive of a periapical cyst 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. A 33-year-old female patient was referred 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 radiotransmission suggestive of a periapical cyst (Figure 1).

Figure 1 - Extensive periapical bone radiotransparency suggestive of periapical cyst



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 in 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 100. 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 filling of the root canal system was performed by the active lateral condensation technique associated with 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 system filling



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 one-year follow-up, the

patient reported absence of signs and symptoms, and the radiographic examination revealed a significant reduction in the periapical lesion with medurar bone formation. (Figure 3).

Figure 3 - Significant regression of the periapical lesion with medurar bone formation.



DISCUSSION

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)

The persistence of a periapical lesion is one of the criteria for determining, in the long term, the failure of treatment. Thus, it is known that infection is the probable cause of a periapical lesion, so the result of endodontic retreatment and its various techniques and biologics will be directly or indirectly involved in this process (TRAVASSOS et al. 2023). 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. For Travassos et al (2021), the adequate follow-up of the therapeutic conduct, the initial radiographic record, the immediate aspect and the final aspect through these radiographic records is indispensable. 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).

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, a significant reduction in the periapical lesion was observed, determining the therapeutic success. (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)

In the one-year follow-up visit, the success of the treatment was proven by the absence of painful symptoms and tissue repair with bone medullary bone neoformation. More conservative approaches should be the professional's first choice ahead of 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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