

CHRONIC APICAL PERIODONTITIS REPAIR: 2-YEAR FOLLOW-UP**REPARO DE PERIODONTITE APICAL CRÔNICA: ACOMPANHAMENTO DE 2 ANOS****REPARACIÓN DE PERIODONTITIS APICAL CRÓNICA: SEGUIMIENTO A LOS 2 AÑOS**

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ABSTRACT

The present study aims to present the clinical case report regarding non-surgical endodontic treatment performed on tooth 37, with a circumscribed periapical lesion, suggesting a phoenix abscess. The methodology consists of an individual descriptive case report study, which includes radiographic images of a 15-year-old female patient. Clinically, in addition to swelling, it was found that there was mobility, absence of pain in the thermal test (cold) and on palpation. After a complete clinical examination, endodontic treatment, coronary opening, root canal exploration, and root canal preparation were initiated using the preparation technique with reciprocating instruments 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 using the single cone technique associated with AH Plus endodontic cement. After the 2 years preservation period, tissue repair and bone neoformation of the area and absence of clinical signs were observed.

Keywords: Endodontics, Periapical Diseases, Root Canal Treatment, Dentistry.

RESUMO

O presente trabalho tem como objetivo apresentar o relato de caso clínico referente ao tratamento endodôntico não cirúrgico realizado no dente 37, com lesão periapical circunscrita, sugestiva de abscesso de Phoenix. A metodologia consiste em um estudo descritivo individual, do tipo relato de caso, que inclui imagens radiográficas de uma paciente

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do sexo feminino, de 15 anos. Clinicamente, além do edema, foi constatado que havia mobilidade, ausência de dor ao teste térmico (frio) e à palpação. Após exame clínico completo, foi iniciado o tratamento endodôntico, abertura coronária, exploração do canal radicular e preparo do canal radicular utilizando a técnica de preparo com instrumentos reciprocantes associada ao hipoclorito de sódio 2,5% como solução irrigadora. Foi aplicada pasta de hidróxido de cálcio como medicação intracanal por um período de 30 dias e o acesso coronário foi selado com ionômero de vidro. Na sessão seguinte, após constatar a ausência de sinais e sintomas clínicos, optou-se pela obturação do canal radicular utilizando a técnica do cone único associada ao cimento endodôntico AH Plus. Após o período de preservação de 2 anos, reparo tecidual e neoformação óssea da área e ausência de sinais clínicos foram observados.

Palavras-chave: Endodontia, Doenças Periapicais, Tratamento de Canal Radicular, Odontologia.

RESUMEN

El presente estudio tiene como objetivo presentar el reporte de caso clínico referente al tratamiento endodóntico no quirúrgico realizado en el diente 37, con una lesión periapical circunscrita, sugestiva de un absceso de fénix. La metodología consiste en un estudio descriptivo de caso individual, que incluye imágenes radiográficas de una paciente femenina de 15 años de edad. Clínicamente, además de inflamación, se encontró que existía movilidad, ausencia de dolor en la prueba térmica (frío) y a la palpación. Luego de un examen clínico completo, se inició el tratamiento endodóntico, apertura coronaria, exploración del conducto radicular y preparación del conducto radicular mediante la técnica de preparación con instrumentos reciprocantes asociados a hipoclorito de sodio al 2,5% como solución irrigante. Se aplicó pasta de hidróxido de calcio como medicación intraconducto por un periodo de 30 días y se selló el acceso coronario con ionómero de vidrio. En la siguiente sesión, luego de verificar la ausencia de signos y síntomas clínicos, se decidió obturar el conducto radicular mediante la técnica de cono único asociado a cemento endodóntico AH Plus. Luego de 2 años de conservación se observó reparación tisular y neoformación ósea de la zona y ausencia de signos clínicos.

Palabras clave: Endodoncia, Enfermedades Periapicales, Tratamiento de Conductos, Odontología.

INTRODUCTION

When root canal treatment is insufficient and unsuccessful, periapical lesions may occur and must be treated. (Del Fabbro *et al.* 2016). Apical periodontitis can be defined as a pathological process, acute or chronic, that occurs in the periapical tissues as a result of an infection in the root canal system after necrosis of the pulp tissue. Although there are physical and chemical factors involved in it, microorganisms are essential for the progression and perpetuation of the pathological process. This persistence can induce an inflammatory process and immune response in the periapical tissues, resulting in local bone destruction, thus affecting the tissue repair process. Treatment should follow an appropriate clinical decontamination protocol, in order to cure the patient's signs and symptoms, with regression of periapical lesions. (Regezi e Sciubba, 2020). Most periapical infections are asymptomatic and the untreated inflammation usually develops gradually and is ongoing, referred to as CAP (Paloma De Oliveira *et al.*, 2017; Amaral *et al.*, 2022).

There are several new treatment options available for eliminating periradicular lesions or enhancing the healing process to save teeth with persistent periapical lesions. Albeit several treatment modalities have been proposed for these teeth which have failed endodontically, there is a need for less invasive methods with more predictable outcomes. It is highly recommended that with technological advances, further minimally invasive approaches must be considered for resolving the issue of persistent apical periodontitis and true cysts to reduce the burden for patients. (Karamifar e Tondari Saghiri, 2020).

Periapical lesions develop as sequelae to pulp disease. They often occur without any episode of acute pain and are discovered on routine radiographic examination. The incidence of cysts within periapical lesions varies between 6 and 55%. The occurrence of periapical granulomas ranges between 9.3 and 87.1%, and of abscesses between 28.7 and 70.07%. It is accepted that all inflammatory periapical lesions should be initially treated with conservative nonsurgical procedures. Studies have reported a success rate of up to 85% after endodontic treatment of teeth with periapical lesions. A review of literature was performed by using electronic and hand searching methods for the nonsurgical management of periapical lesions. Various methods can be used in the nonsurgical management of periapical lesions: the conservative root canal treatment. (Fernandes e de Ataide, 2010).

Controlled memory alloys (CMcontrolled memory) are part of this new generation of NiTi instruments, representing a huge evolutionary leap, significantly modifying the approach and conduct of the technique. Its high flexibility and the thermal and surface treatment received during its manufacture have demonstrated safe clinical performance. (Boonchoo *et al.* 2020). This may represent an advantage in conservative endodontic approaches as the preservation of dentin, especially periradicular dentin, provides gains in mechanical resistance to teeth undergoing endodontic treatment. (Costa *et al.* 2021). Mechanization in the preparation of canals stands out with the introduction of rotary movements in endodontic files, aiming to overcome the difficulties encountered by manual instrumentation, such as delays in procedures, professional stress and canal fractures. (Gadelha *et al.* 2024).

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)

CASE DESCRIPTIONS

A 29-year-old male patient was referred to the private office for treatment of tooth 47. The clinical examination showed the presence of a fistula (Figure 1), and the periapical radiograph revealed periapical bone radiolucency involving both roots. Pulp sensitivity tests did not produce any response in the tooth. Chronic apical periodontitis was diagnosed. Non-surgical endodontic therapy was planned (Figure 1).

Figure 1 - Presence of a fistula



Source: Authors

Figure 2 - Periapical bone radiolucency involving both roots



Source: Authors

After the antiseptis procedures, anesthesia of the inferior alveolar nerve was performed, followed by absolute isolation and removal of the decayed tissue with a spherical drill No. 2 (KG Sorensen, Cotia-SP, Brazil) at high rotation, followed by coronary opening of element 47. Subsequently, it was irrigated with a 2.5% sodium hypochlorite solution and the canal was explored with a K#15 instrument (Dentsply-Meillefer). Electronic odontometry was performed with an apex locator with a K-Flexofile manual file number 25. The preparation of the root canals was performed with reciprocating files Reciproc R 25 in the mesial canals and R40 in the distal canals. Bio-C Repair - bioceramic repatative material (Angelus) was used as an intracanal medication for 30 days. Filling the root canal system- Bio-C Repair (Figure 3).

Figure 3 - Filling the root canal system- Bio-C Repair.



Source: Authors

The filling of the root canal system was performed using the single-cone technique associated with Bio-C Sealer cement. (Figure 4). there was leakage of cement into the periapical region.

Figure 4 - Filling of the root canal system



Source: Authors

The clinical and radiographic follow-up performed after 2 after the conclusion of the treatment in the preservation consultation determined complete regression of periapical bone radiolucency. (Figure 5).

Figure 5 - Complete regression of periapical bone radiolucency.



Source: Authors

Summary of all stages of endodontic treatment, from diagnosis to radiographic control (Figure 6).

Figure 6 - Summarizes the entire endodontic therapy from the presence of fistula, initial radiography, intracanal medication, filling of the root canal system and follow-up of the case.



Source: Authors

DISCUSSION

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). 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. (TRAVASSOS *et al*. 2024).

Therefore, complete disinfection and subsequent three-dimensional sealing of the root canal system are essential for achieving endodontic success (NAIR,2004). Unfortunately, despite protective measures involving the use of the latest antimicrobial agents, root canal preparation, and root canal filling techniques, the incidence of endodontic failure remains high (Ng *et al*.

2007). Inadequate coronal sealing, poor or overstretched root canal fillings, complications during mechanical preparation, and untreated canals serve as factors that can cause endodontic failure due to the persistence of pathogenic bacteria. (Galler *et al.* 2021).

Periapical lesions often arise as a consequence of pulpal diseases, and most inflammatory periapical lesions are initially managed with conservative non-surgical methods. The success of root canal treatment hinges on the thorough cleaning, shaping, and obturation of the root canal system. Calcium hydroxide and triple antibiotic paste are preferred intracanal medicaments due to their effective antibacterial properties.

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.

Though root canal instrumentation along with irrigation greatly reduces the number of bacteria in the infected canals, it is difficult to obtain complete disinfection in all cases. The use of intracanal medicaments helps in reducing or inhibiting the growth of microbes that are left behind after cleaning and shaping to prevent reinfection. This will ensure lesion reduction or resolution. (Susila e Janu, 2020, Travassos *et al.* 2024).

By the combined effect of proper instrumentation, irrigation, their activation, intracanal medicaments and obturation, a periapical lesion can be conservatively managed by non -surgical endodontic therapy. But in some cases, the lesion fails to subside where surgical approach should be considered as the second line of management. (Ramesh *et al.* (2024). 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. 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. (Travassos *et al.* 2021, Travassos *et al.* 2024 -A). Periapical lesions often arise as a consequence of pulpal diseases, and most inflammatory periapical lesions are initially managed with conservative non-surgical methods. The success of root canal treatment hinges on the thorough cleaning, shaping, and obturation of the root canal system. Calcium hydroxide and triple antibiotic paste are preferred intracanal medicaments due to their effective antibacterial properties. (Arunim *et al.* 2024).

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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