Clinical

http://dx.doi.org/10.1590/1981-86372025000820230100

Revista Gaúcha de Odontologia

Endodontic approach in tooth with internal root resorption: case report

Abordagem endodôntica em dente com reabsorção radicular interna: relato de caso

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ABSTRACT

Internal root resorption is characterized by the destruction of dentin from the root canal wall because of clastic cell activity; endodontic treatment is necessary to remove its etiology. Intracanal medication and an adequate filling are essential for treatment and are essential to prevent recurrence. This research aimed to report on the treatment of an internal root resorption, evaluating its follow up. A 22- year-old male patient presented to the School of Dentistry of the Federal University of Campina Grande with painful symptomatology in the region of upper incisors and relative mobility in element 22. The radiographic examination revealed a radiolucent image, changing the contour of the root canal, suggesting an internal root resorption between the middle and apical thirds. Computed tomography of the conical bundle confirmed the diagnosis, accurately providing the extent of the lesion that communicates to

How to cite this article

Mascena DDS, Gomes LL, Sarmento TCAP, Rosendo RA. Endodontic approach in tooth with internal root resorption: case report. RGO, Rev Gaúch Odontol. 2025;73:e20250009. http://dx.doi.org/10.1590/1981-86372025000820230100

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the lateral periodontium. In the endodontic treatment, Fava's technique was used in instrumentation and the calcium hydroxide paste was the intracanal medication of choice, remaining within the channels for an approximate period of 120 days, with periodic changes. In the obturation, the Tagger's hybrid technique was performed with gutta percha cones and Sealer 26 endodontic cement. According to the case described, it was possible to observe that the postoperative control (3 and 6 months) revealed that a symptomatology related by the patient had completely processed. Repair of internal resorption was confirmed by periapical radiographs and computed tomography, requiring follow-up for a longer period. The thermoplastic endodontic obturation using Tagger's hybrid technique and the use of $Ca(OH)_2$ inside the root canal system, for a long period of time, through the treatment of internal root resorption, shows impressive results for this pathology.

Indexing terms: Calcium hydroxide. Dental pulp cavity. Endodontics.

RESUMO

A reabsorção radicular interna caracteriza-se pela destruição da dentina a partir da parede do canal radicular como resultado da atividade de células clásticas; o tratamento endodôntico é necessário para remover sua etiologia. A medicação intracanal e uma obturação adequada são imprescindíveis para o tratamento e são essenciais para prevenir a recidiva. Este trabalho teve como objetivo relatar o tratamento de uma reabsorção radicular interna, avaliando sua proservação. Paciente masculino, 22 anos de idade, apresentou-se à Clínica-Escola de Odontologia da Universidade Federal de Campina Grande com sintomatologia dolorosa na região de incisivos superiores e relativa mobilidade no elemento 22. O exame radiográfico revelou imagem radiotransparente, alterando o contorno do canal radicular, sugerindo uma reabsorção radicular interna entre os terços médio e apical. A tomografia computadorizada de feixe cônico confirmou o diagnóstico, fornecendo com exatidão a extensão da lesão que se comunica ao periodonto lateral. No tratamento endodôntico, empregou-se a técnica biescalonada de Fava na instrumentação e a pasta de hidróxido de cálcio foi a medicação intracanal de eleição, permanecendo no interior dos canais por um período aproximado de 120 dias, com trocas periódicas. Na obturação realizou-se a técnica híbrida de Tagger com cones de guta percha e cimento endodôntico Sealer 26. De acordo com o caso descrito, foi possível observar que o controle pós-operatório (3 e 6 meses) revelou que a sintomatologia relatada pelo paciente cessou por completo. O reparo da reabsorção interna foi confirmado pelas radiografias periapicais e tomografia computadorizada, necessitando de proservação por um intervalo de tempo maior. O desfecho da termoplastificação utilizando a técnica Híbrida de Tagger e o uso do $Ca(OH)_2$ no interior do sistema de canais radiculares, por um longo período de tempo, mediante tratamento das reabsorções radiculares internas, mostram resultados satisfatórios para esta patologia.

Termos de indexação: Calcium hydroxide. Cavidade pulpar. Endodontia.

INTRODUCTION

Acting in a preventive and curative manner, endodontic treatment is indicated, aiming at maintaining the teeth in the oral cavity, and restoring the function of the dental elements with compromised pulp and/or periapical tissues [1]. Endodontic treatment, regardless of the pathology, aims to act to cure the pathological process, eliminating the etiological factor, in addition to preventing the progression of the resorptive lesion, in the case of resorptions [2].

Root resorption is characterized by the action of clastic cells and consists of the destruction of part of the mineralized tissues of the tooth. The characteristic of the lesion is the presence of highly vascularized granulation tissue, resulting from local inflammation [3].

Dental trauma, depending on the intensity, type and duration of the impact, can lead to fractures, dislocations or avulsions. Treatment often requires multidisciplinary approaches, as 2 out of 3 individuals suffer dental trauma before reaching adulthood. Most complications due to trauma are obliteration of pulp tissue, necrosis and root resorption; and can occur weeks, months or even years after the trauma episode [4].

The mechanisms of occurrence of dental resorption are known and already defined and can occur through inflammatory reactions or by replacement. They do not cause pulp lesions but occur as subsequent consequences. Although there are several causes for the appearance of dental resorption, it is not correct to state that they are multifactorial diseases [5].

Differential diagnosis of resorptions is extremely important, as it is quite common to get confused when trying to differentiate internal and external resorption lesions. In general, internal resorptions present with a widening of the canal and are radiographically characterized by an oval shape [6].

This study aims to report, through a clinical case, Internal Root Resorption (IRR) in an upper lateral incisor, its etiologies and approaches to the proposed treatment.

CASE REPORT

A 22-year-old male patient, black, normosystemic, presented to the endodontics clinic of the Dental School of the Universidade Federal de Campina Grande (UFCG), reporting spontaneous, continuous and localized pain in the region of tooth 21, in addition to relative mobility in tooth 22. Upon performing the initial radiograph, it was found that tooth 22 had a radiolucent area in the middle third of the root, suggestive of IRR (figure 1). This study was approved by the Research Ethics Committee of Universidade Federal de Campina Grande, under opinion number CAEE: 73778723.2.0000.5182, in accordance with the guidelines of Resolution 466/12 of the Brazilian National Health Council.

The treatment plan was proposed to try to treat the IRR urgently using Fava's technique but stopping the pain of the acute apical periodontitis of tooth 21, also through endodontic treatment.

Figure 1. Initial and diagnostic periapical radiograph.

Cone Beam Computed Tomography (CBCT) of the anterior region of the maxilla was requested to obtain greater precision in the location and wealth of details of the lesion for a more accurate diagnosis. The suspicion of communication of the lesion with the lateral periodontium was confirmed by CBCT (figure 2 and figure 3).

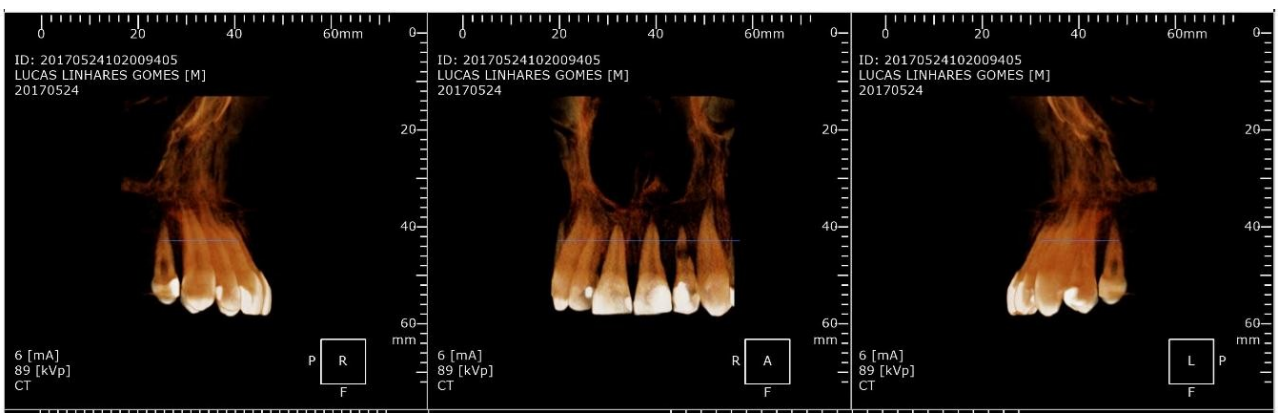

Figure 2. 3D panoramic image of the Conical Beam Computed Tomography for diagnosis of the requested region.

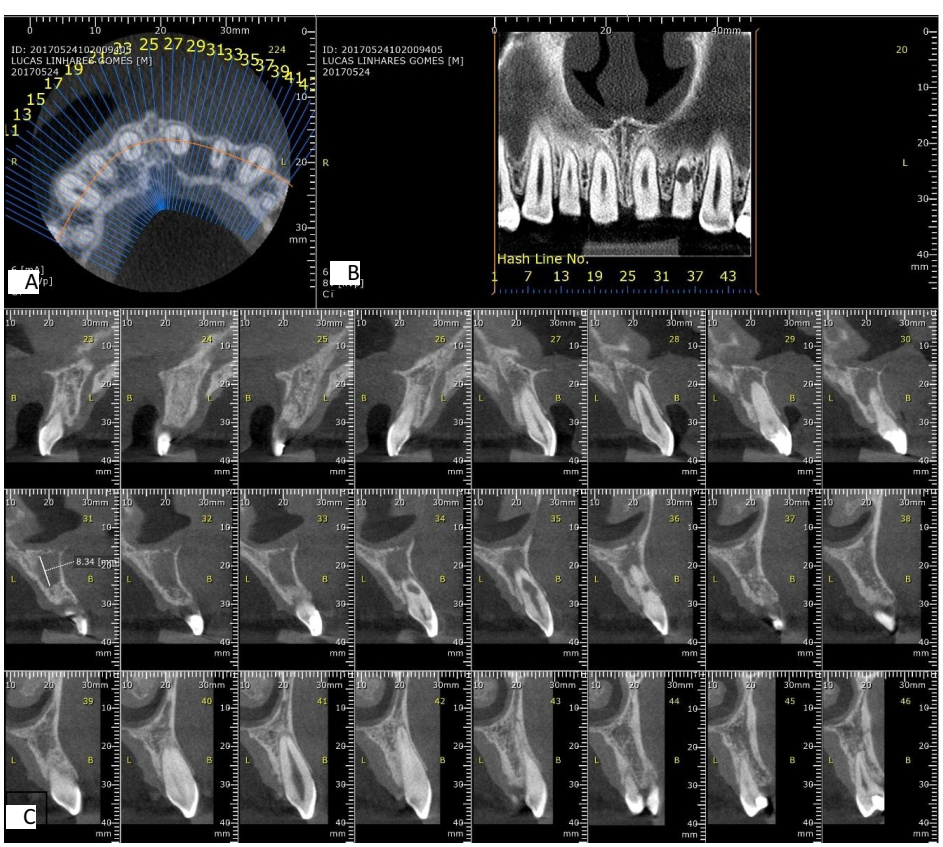

Figure 3. Cone Beam Computed Tomography for diagnosis of the requested region. A: Cross-sectional image. B: Coronal image. C: Sagittal image.

Pulpectomy of tooth 22 was performed with 4% Articaine anesthetic and for endodontic access, a 1013 diamond spherical drill was used. The Apparent Tooth Length (ATL) was 21.5 millimeters (mm), thus establishing a Provisional Length of Working (PLW) at 17.5 mm. The cervical and middle preparation, respecting the PLW, was carried out using Gates Glidden drills numbered #5, #4, 3# and #2; always irrigating, aspirating and flooding the canal with 2.5% sodium hypochlorite (NaOCl) and interspersing it with a manual file, type k-flexofile #15 Dentisply Maillerfer®, to explore the root canal.

Files #60, #55, #50, #45, all of the k-file type (Destisply Maillefer®) and calibrated at 19.5 mm (ATL-2), were used in the canal instrumentation, using a chlorinated solution – 2.5% NaOCl – between using one file and another, followed by exploring the canal.

Odontometry (figure 4) was performed using radiography with the Initial Apical Instrument (IAI) #45 inside the root canal, obtaining a Real Tooth Length (RTL) of 20 mm, ending with Working Length (WL) in 19mm; at these lengths, the achievement of the foraminal patency and the apical stop were increased, respectively. For foraminal patency, a k-file #15 file was used as the Apical Foraminal Instrument (AFI), and k-file #45 (IAI), #50 and #55 files were used to create the apical stop, always irrigating, sucking and flooding with the chosen irrigating solution.

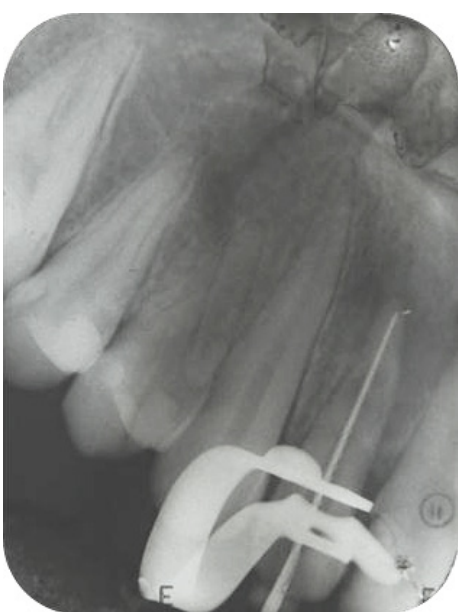

Figure 4. Periapical odontometry radiograph.

A new odontometry was performed with the aid of the Gnatus® electronic apex locator, which confirmed that the resorptive cavity communicated with the lateral periodontium, making a prognosis of treatment success even more difficult. There was a change of medication from calcium hydroxide $Ca(HO)_2$ paste with camphorated paramonochlorophenol – Calen PMCC®, remaining for a period of 35 days.

To carry out the instrumentation in the apex-crown direction, k-file #60 files were used, calibrated at 18 mm (WL-1), #70, at 17 mm (WL-2) and #80, at 16 mm (WL-3); always irrigating, sucking and flooding the

interior of the Root Canal System (RCS) with the irrigating solution and between using one file and another, using the AFI in RTL. The intracanal medication used was Calen PMCC® paste introduced into the canal for a period of 42 days.

Before the second change of Calen PMCC® medication inside the RCS, the cavity was cleaned with abundant irrigation of 2.5% sodium hypochlorite, abundant irrigation of 0.9% saline solution, application of acid Ethylenediamine Tetra-Acetic 17% (EDTA) as chelating agent, being stirred inside the RCS with the aid of a 20 mm k-file #45 file for 3 minutes. After aspiration of the chelating agent, abundant irrigation and aspiration of 0.9% saline solution were performed, followed by 2.5% sodium hypochlorite.

Before filling, a third change of Calen PMCC® paste was performed, which remained inside the RCS for 42 days. Realizing that the endodontic conditions were favorable for obturation, the technique used was the hybrid Tagger technique, the #60 gutta percha cone was used as the main cone and FF cones as accessories and a McSpadden condenser was used for thermoplasticization of the gutta percha to greater accommodation of the filling material in the RCS. Coronary sealing was performed with light-cured glass ionomer and 20 days later, the definitive restoration in composite resin was performed (figure 5).

Figure 5. Final Periapical Radiograph.

The one-year follow-up CBCT (figure 6) shows perfect completion of filling material inside the RCS and in the resorption cavity and a slight extravasation of this material in the communication of internal reabsorption with the lateral periodontium.

Figure 6. A: cross-section of the anterior region of the maxilla. B: 3D reproduction of upper incisor area. C: coronal section of the upper incisor region.

DISCUSSION

Dental trauma is one of the public health problems related to accidents and acts of violence that affect individuals of both sexes and almost all age groups. This corresponds to approximately 4 to 33% of the population. However, male individuals, because they are more involved in more violent physical and work activities than women, are the gender most likely to suffer from IRR. The most affected teeth are the upper anterior teeth, due to their position in the arch, which has a slight inclination towards the vestibular [7-9].

In general, IRRs are considered rare pathologies. A study by Carvalho ([8] shows that, of 178 traumatized teeth, only 2.4% presented IRR as a late complication [10].

The prevalence of root resorption is not related to gender, but to the shape of the tooth roots [11,12]. Internal Root Resorption predominantly affect male individuals and highlights that auto transplant treatment is highly associated with the appearance of the lesion in the tooth in question [13,14].

The classification of resorptions according to Consolaro is based on their place of origin, from the internal wall of the canal or from the external surface of the roots, classifying them as internal and external resorptions, respectively. In addition to internal-external, when there is a resorptive process on both root surfaces, internal and external, and it is difficult to identify which surface initiated the process; the classification extends to the region of the tooth (coronal, cervical or apical); and to its etiology (inflammatory or by replacement) [15]. Fastlicht [16] classified resorptions into three large groups according to their location, which can be categorized as: internal, lateral and apical.

In clinical practice, radiographs are extremely important, but they have limitations in relation to the detection, type, location and extent of resorptions, this is because the tooth, which has three-dimensional anatomy, has an image projected in only two dimensions [17]. Periapical radiographs are used to demonstrate various dental complications; however, they can compromise the accurate diagnosis of certain pathologies, including IRRs. Panoramic radiographs are contraindicated for the diagnosis of resorptions, especially if they are small to medium in size. In this case, CBCT is an additional resource for the detection of root resorptions, since CBCT provides us with three-dimensional images, in addition to better resolution and precision [18-20].

The treatment of teeth with inflammatory internal resorption consists of removing the pulp tissue from inside the RCS, since, in the absence of pulp tissue, associated with the use of bioceramic materials, the inflammation will cease, thus stagnating the resorptive process [21,22]. NaOCl is the solution of choice for irrigating canals during endodontic treatment, because it has an effective antimicrobial effect against RCS infection, in addition to having the capacity to dissolve organic matter, NaOCl also has low viscosity, which gives it the ability to enter the RCS complex, it is cheap and has an acceptable shelf life [23]. $Ca(HO)_2$ is the most widely used medication because it has a wide range of desirable properties, of which two enzymatic properties deserve to be highlighted: antimicrobial effect and the effect of activating tissue enzymes, thus producing a mineralizing effect [24]. $Ca(HO)_2$ as an intracanal medication is essential, as it can contain and attenuate the progression of the lesion, although it cannot stop it. In addition, $Ca(HO)_2$ has an antimicrobial effect, creating a basic environment that is capable of neutralizing clastic activity and stimulates the proliferation of stem cells [25,26].

The treatment of root resorption consists of removing the pulp tissue and treating the RCS appropriately, although accessing the absorptive lesion and promoting its cleaning are the problems of the treatment. As for the obturation of the canal, it is advisable to use a technique that promotes thermoplasticization of the gutta-percha; the Tagger technique and thermoplasticization with the aid of the ultrasonic system are recommended and widely used techniques, since both can guarantee the effectiveness of the obturation in filling the internal resorption cavity [27].

Control and follow-up radiographs of endodontically treated teeth with or without root resorption are extremely important, as they will confirm the prognosis of the treatment. Control radiographs should be taken in the first year after treatment and should continue to be taken for the following 4 years, thus indicating whether the disinfection of the RCS and the use of biological materials contributed to the success of the endodontic therapy [28].

Periapical radiographs provide two-dimensional information, so the interpretation of the extent and location of lesions is limited. The diagnosis of IRRs requires a lot of attention from the dentist, but since it is most often an asymptomatic pathology, late diagnosis often offers an unpredictable and doubtful prognosis [29,30].

CONCLUSION

The permanence of $Ca(OH)_2$ for a long period of time inside the root canal system, as well as the use of the Tagger Hybrid obturation technique, have great advantages in the treatment of teeth with IRR, since it promotes stagnation of the resorptive process and tissue repair as evaluated during the follow-up of the clinical case in question.

Conflict of interest: The authors declare that there are no conflicts of interest

Collaborators

DDS Mascena, conceptualization, project administration, data curation, writing – original draft. LL Gomes, resources, writing – original draft. TCAP Sarmento, project administration, validation. RA Rosendo, validation, writing – review & editing.

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Received on: 7/11/2023
Final version resubmitted on: 28/6/2024
Approved on: 17/12/2024

Assistant editor: Luciana Butini Oliveira