INTERNAL RESORPTION IN THE CERVICAL AND MIDDLE THIRD OF THE LEFT UPPER INCISOR

https://doi.org/10.56238/sevened2025.011-045

Rosana Maria Coelho Travassos[1], Samuel Nogueira Lima[2], William José Lopes de Freitas[3], Josué Alves[4], Mônica Maria de Albuquerque Pontes[5], Alexandre Batista Lopes do Nascimento[6], Pedro Guimarães Sampaio Trajano dos Santos[7], Verônica Maria de Sá Rodrigues[8], Priscila Prosini[9], Kattyenne Kabbaz Asfora[10], Ronaldo de Carvalho Raimundo[11] and Vânia Cavalcanti Ribeiro da Silva[12].

ABSTRACT

Patient, JTRM, Caucasian, female, 25 years old, without systemic problems, was referred to the private office of an endodontic specialist for treatment of tooth 11. In the periapical radiographic examination, the presence of internal root resorption in the third cervical and middle root canal, with well-defined limits, ovoid appearance and apparent no communication with the adjacent bone. A cone beam computed tomography was requested to analyze in greater detail the location and whether there was communication with the periodontium. The apical chemical-mechanical preparation, according to the CRD, was performed with Solla Files #70.03. Having concluded the chemical-mechanical preparation of the first session, the irrigation protocol was performed using the XP endo finisher file (FKG), with cycles of 3 x 20 s of sodium hypochlorite at 2.5%, 3 x 20 s of trisodium EDTA (Biodinâmica, Brazil) at 17% and again 3 x 20 s with hypochlorite Canal obturation performed using the modified Tagger hybrid technique: main cone of gutta-percha 60 associated with BIO-C Sealer (Angelus-Londrina) obturator cement and accessory cones. (Figure 3). Complete filling of internal reabsorption was observed. It is concluded that early detection and a differential diagnosis The goal of endodontic therapy is the removal of

[1] Doutora em dentistica e endodontia
Faculdade de Odontologia de Pernambuco
[2] Doutor em clínicas Odontológicas
Centro universitário Mário Juca
[3] Doutor em Odontologia
Faculdade de Odontologia de Pernambuco/UPE
[4] Doutor em Reabilitação Oral - FOB- USP.
Faculdade de Odontologia de Pernambuco
[5] Doutora de Dentistica e Endodontia
Faculdade de Odontologia de Pernambuco
[6] Doutor em Dentística e Endodontia
Faculdade de Odontologia de Pernambuco
[7] Graduando em odontologia
Faculdade de Odontologia do Recife
[8] Doutora em Dentística e Endodontia
Faculdade de Odontologia de Pernambuco
[9] Doutora em Odontologia
Universidade de Pernambuco
[10] Doutora em Dentistica e endodontia
Faculdade de Odontologia de Pernambuco
[11] Doutor em Cirurgia e Traumatologia Buco Maxilo Facial.
Faculdade de Odontologia de Pernambuco.
[12] Doutora em odontologia (Estomatologia)
Faculdade de Odontologia de Pernambuco

inflammatory tissue and the three-dimensional shaping, cleaning and filling of the enlarged canal space, while also avoiding unnecessary removal of dentin that could further weaken the root canal. remaining tooth structure.

Keywords: Endodontics. Tooth resorption. Internal resorption.

INTRODUCTION

Dental roots are surrounded by presementum on the outer surface and predentine on the inner surface. Dentine tissue begins to resorb with cellular activity when these structures are damaged by infections, mechanical or chemical factors.[1] If resorption occurs on the external root surface, it is called external root resorption (ER). If it develops within the root canal due to pulpal origin, it is called internal root resorption (IR) which can be progressive or temporary. (Fuss, Tsesisl, Lin, 2003).

Root resorption can be classified as external or internal based on its location relative to the root surface. The progressive odontoclastic activity-induced destruction of the internal radicular dentin is referred to as internal root resorption (IRR). The two common types of internal resorption are (i) internal inflammatory resorption and (ii) internal replacement resorption. (Patel et al. 2009).

In dentistry, tooth resorption refers to the loss of organic and inorganic components of tooth structure undertaken by clastic cells . Loss of enamel, dentine and cementum has an array of implications, ranging from structural compromise to the tooth with attendant risk of tooth loss, to possible infection of the root canal system and potential periodontal consequences. A correct diagnosis and understanding of the aetiology involved in tooth resorption is critical for effective management (Lin et al. 2022).

Damage to cementum or dentine attracts clastic cells to the area and resorption occurs as part of the normal inflammatory response to tissue injury. In the absence of infection, the inflammatory response is transient and repair often occurs with cementum-like tissue. Surface resorption may be further divided into internal or external surface resorption, depending on its location.(Gunraj, 1999).

Internal surface resorption is denoted by shallow resorption of the dentine walls of the root canal. Transient non-infective irritation to the pulp is suggested to be a contributing factor, resulting from minor mechanical trauma in the form of occlusal forces or external bleaching. (Abbott, Lin, 2022).

Internal root resorption is a rare insidious process that can lead to premature tooth loss. Endodontists must be prepared to correctly manage this pathology, often using advanced diagnostic techniques such as computed tomography, and always being aware of new materials developed to ensure endodontic success. Care must be taken to distinguish internal resorption from other types of resorption so that appropriate treatment can be employed, in addition to observing long-term clinical success. (Travassos et al. 2024).

Diagnosis is primarily made through periapical radiographs, with a relatively round, symmetrical and centrally located radiolucency of the root canal space. Confirmation of

internal resorption may be acquired through taking shift radiographs which should not change the positional relationship of the canal to the resorptive Entity, however, exceptions do occur such as in cases of extensive resorption. (Asgary et al. 2014). Internal resorption is generally asymptomatic. It may be diagnosed on a routine radiographic examination. (Jhamb, 2015). Internal root resorption normally follows an asymptomatic and silent clinical course, it does not cause pain or necrosis, since the quantity of mediators present to induce tissue resorption mineralized is not enough to cause discomfort to the patient.Due to its normally asymptomatic evolution, the diagnosis is made through routine radiographic examinations, which show a radiolucent, symmetrical, ovoid or rounded image, altering the original contour of the root canal (Laux et al., 2020).

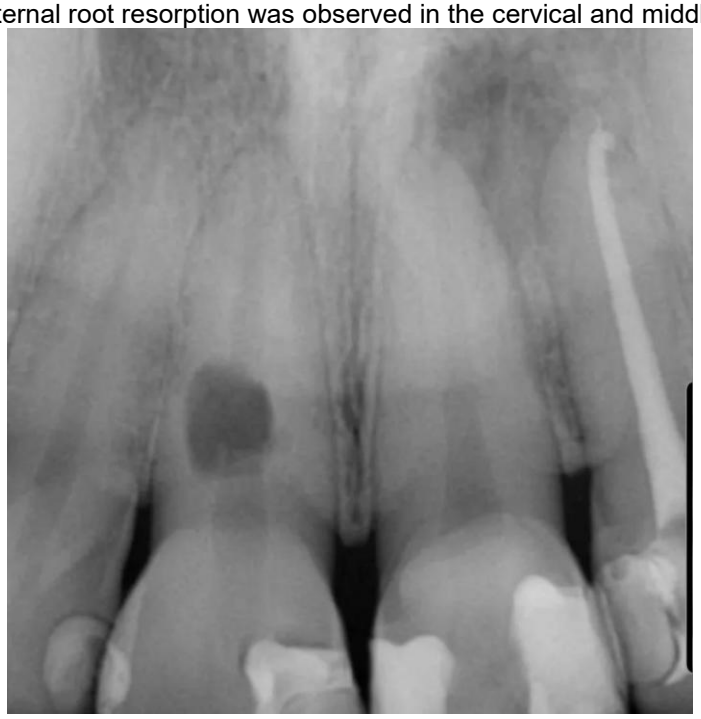
AIM

To describe the use of cone beam computed tomography (CBCT) in the diagnosis and management of a maxillary lateral incisor with internal root resorption.

CASE REPORT

Patient, JTRM, white, female, 25 years old, without systemic problems, was referred to the private office of an endodontic specialist for treatment of tooth 11. In the periapical radiographic examination, the presence of internal root resorption was observed in the cervical and middle third of the root canal, with well-defined limits, ovoid appearance and apparent lack of communication with the adjacent bone. (Figure 1).

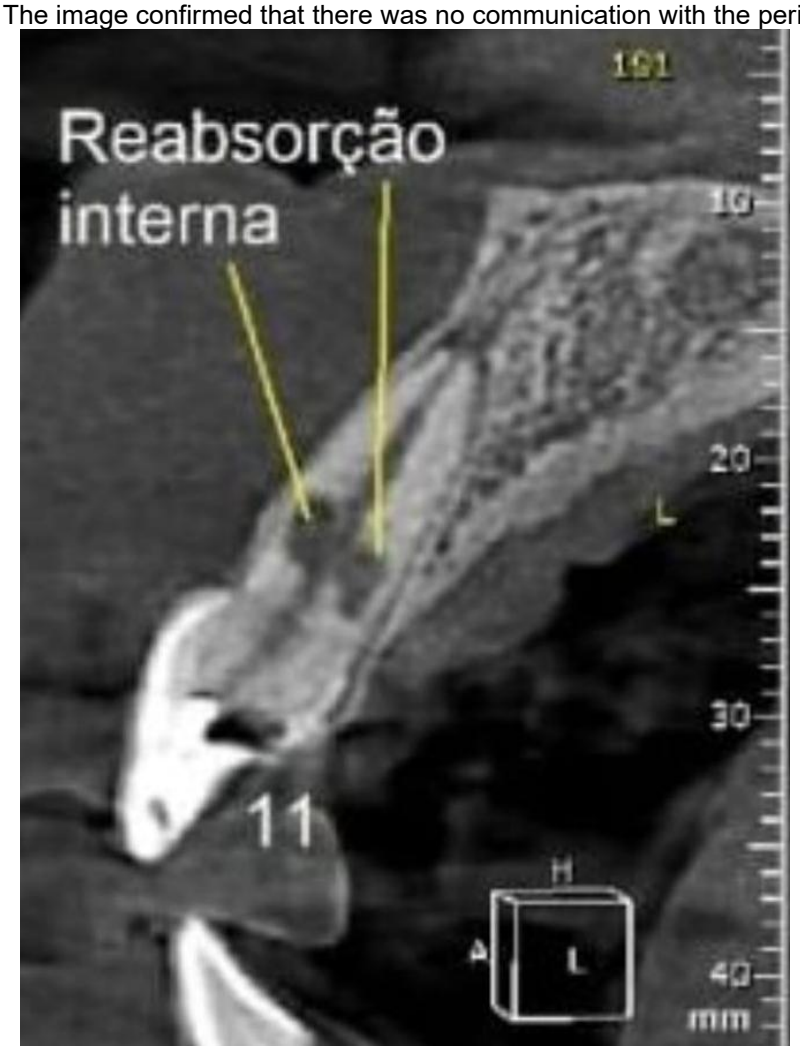
Figure 1- presence of internal root resorption was observed in the cervical and middle third of the root canal.



The patient was sufficiently informed about the status of his oral health, as well as the proposed treatment, and signed a consent form, considering the ethical and legal principles to clinical care.

A cone beam computed tomography scan was requested to analyze the location in greater detail and whether there was communication with the periodontium (Figure 2). The image confirmed that there was no communication with the periodontium.

Figure 2- The image confirmed that there was no communication with the periodontium.

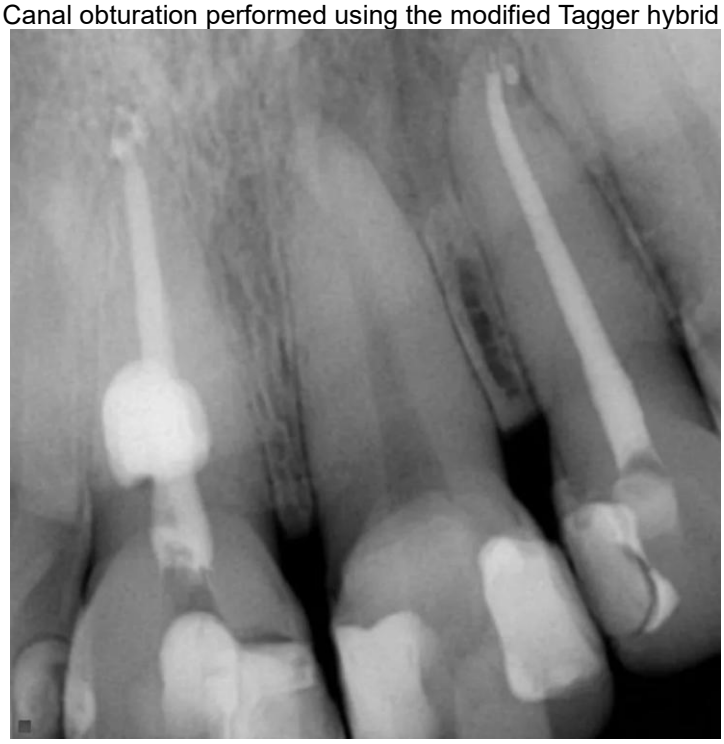


Anesthesia was performed with 2% lidocaine 1: 100,000 IU of epinephrine (Alpha-caine® - Nova DFL), and the coronal opening was performed with a 1014 round bur, followed by exploration of the root canal to the length of CAD-2 with a Kerr file #15 (Dentsply-Maillefer, Petrópolis, RJ, Brazil). The enlargement of the cervical third was performed with a Solla Files #60.03 to the length of CAD-4 at a speed of 750 rpm and torque of 3 N in a rotary motion, and the chemical-mechanical preparation of the tooth in CAD-2 with a Solla Files file #35.04 . was chosen to perform electronic odontometry, using the apex locator (Novapex, Israel), thus obtaining the real length of the tooth (CRD).

The apical chemical-mechanical preparation, according to the CRD, was performed with Solla Files #70.03. Having concluded the chemical-mechanical preparation of the first session, the irrigation protocol was performed using the XP endo finisher file (FKG), with cycles of 3 x 20 s of sodium hypochlorite at 2.5%, 3 x 20 s of trisodium EDTA (Biodinâmica, Brazil) at 17% and again 3 x 20 s with hypochlorite.

Canal obturation performed using the modified Tagger hybrid technique: main cone of gutta-percha 60 associated with BIO-C Sealer (Angelus-Londrina) obturator cement and accessory cones. (Figure 3). Complete filling of internal reabsorption was observed.

Figure 3 - Canal obturation performed using the modified Tagger hybrid technique.



Clinical and radiographic follow-up was performed two years after the canal obturation, determining the success of the endodontic therapy. (Figure 4).

Figure 4 - Clinical and radiographic follow-up was performed two years after the canal obturation.

DISCUSSION

Root resorption is the loss of dentine or cementum as a result of osteoclastic cell action. IRR occurs exclusively as a result of pulpal inflammation. Until very recently, the diagnosis of internal and external resorptive defects has been limited to the information obtained from conventional radiographic techniques. This case report describes the use of CBCT in the diagnosis and treatment planning of a case of internal root resorption. Emphasis is given to the modifications made to the treatment procedures in view of the additional information obtained from the CBCT data. Madani et al. 2016, Travassos et al. 2024).

Internal root resorptive defects may perforate the external root surface, and this may not be detectable using conventional radiographic techniques; consideration of this should be made during diagnosis and treatment planning. CBCT provides additional relevant information on the location and nature of root resorptive defects when compared with that provided by conventional radiographs. Bhuva et al. 2011).

As a consequence, internal resorptions are generally rare and asymptomatic cases, but they may require different treatment protocols depending on their progress. In addition, the application of CBCT according to the progress of the case is a great advantage. It is important to determine the required treatment protocol by assessing the amount of

destruction in the case (perforation, bone loss, etc.). Such an accurate evaluation is an important key to the success of the treatment.

The progression of internal root resorption depends on the presence of vital tissue in the root canal. (Andreasen, Andreasen, Andersson, 1981). Therefore, when the diagnosis of IR is made, the root canal treatment should be started as soon as possible to prevent further hard tissue loss and root perforation. (Haapasalo M, Endal, 2006). If the lesion is not detected or remains untreated, it grows and perforates the root surface from the inside. When detected early, treatment and long-term prognosis of the tooth is good. If significant destruction of tooth tissue or resorption approaches the marginal bone, it weakens the tooth and adversely affects the prognosis of treatment. (Gabor et al. 2012, Ramos 2024).

IR is a complex interaction of resorbing and inflammatory cells in permanent teeth, resulting in the resorption of dental hard tissues. ((Tronstad, 1988, Rodrigues et al., 2022). IR is usually asymptomatic and shows clinical findings in only about 2% of cases. In the present case he was also asymptomatic.

Cone beam computed tomography has shown better results for diagnosis, due to greater precision and information. The use of instruments that enhance chemical substances is indicated for canal disinfection. Currently, calcium silicate-based materials have been created and have been recommended for filling canals with internal resorption due to their greater bond strength, smaller particle size and creation of empty spaces (gaps) between the fillings. In conditions where there is suspicion or confirmation of inflammatory internal root resorption associated with external root resorption, it is more effective to use cone beam computed tomography, as this helps to estimate the extent of the lesion and detect perforations of the neighboring periodontal ligament (Koehne et al., 2020) as well as the thickness of the dentin of the remaining root canal (Abdullah et al. 2017). Tomography generates three-dimensional images and allows observation of resorption even in the early stages and is currently considered the gold standard for evaluating inflammatory internal root resorption, since two-dimensional radiographs cannot accurately identify it when it is in the cervical area. (Câmelo et al, 2019).

Regarding mechanical preparation, manual instruments were chosen due to their satisfactory modeling and cleaning, and the radiographic image was of a straight and wide canal. The reverse magnification technique (crown-apex without pressure) was chosen together with the use of a 2.5% sodium hypochlorite solution. The choice of the percentage of 2.5% sodium hypochlorite was made because the instrumentation time was greater than 30 minutes, which is equal to the dissolution capacity of the organic tissue of 5% sodium hypochlorite, thus removing more than 90% of the existing pulp tissue. (Del Carpio-

Perochena, 2001). Constant studies and efforts have enabled better configuration of files, as well as greater flexibility, speed, safety and optimization of clinical time. Among these advances, mechanization in canal preparation 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 fractures of the canals. (Gadelha et al. 2024).

The clinical case demonstrates that the treatment protocol followed according to the literature would allow clinical resolution of internal root resorption. A long-term follow-up is necessary to determine the success of the treatment which in this case was 2 years.

CONCLUSION

Root canal treatment remains the only treatment of choice for teeth diagnosed with internal resorption. Early detection and correct differential diagnosis are essential for the successful management of internal resorption.

REFERENCES

1. Abbott, P. V., & Lin, S. (2022). Tooth resorption—part 2: A clinical classification. Dental Traumatology, 38(4), 267–285. https://doi.org/10.1111/edt.12725

2. Abdullah, D., Hussein, F. E., & Abd Ghani, H. (2017). Management of perforating idiopathic internal root resorption. Iranian Endodontic Journal, 12(2), 257.

3. Del Carpio-Perochena, A. E. (2001). Capacidade de dissolução do hipoclorito de sódio e da clorexidina sobre o biofilme oral formando “in situ” [Dissertação de mestrado, Universidade de Bauru].

4. Andreasen, J. O., Andreasen, F. M., & Andersson, L. (1981). Traumatic injuries of the teeth (p. 193). Munksgaard.

5. Asgary, S., Eghbal, M. J., Mehrdad, L., Kheirieh, S., & Nosrat, A. (2014). Surgical management of a failed internal root resorption treatment: A histological and clinical report. Restorative Dentistry & Endodontics, 39(2), 137–142.

6. Bhuva, B., Barnes, J. J., & Patel, S. (2011). The use of limited cone beam computed tomography in the diagnosis and management of a case of perforating internal root resorption. International Endodontic Journal, 44, 777–786.

7. Camêlo, F. A. L., et al. (2019). Retratamento endodôntico em dente anterior acometido por reabsorção radicular interna: Relato de caso. Revista Eletrônica Acervo Saúde, (21), e669.

8. Fuss, Z., Tsesis, I., & Lin, S. (2003). Root resorption–diagnosis, classification and treatment choices based on stimulation factors. Dental Traumatology, 19, 175–182.

9. Gabor, C., Tam, E., Shen, Y., & Haapasalo, M. (2012). Prevalence of internal inflammatory root resorption. Journal of Endodontics, 38(1), 24–27.

10. Gunraj, M. N. (1999). Dental root resorption. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology, 88(6), 647–653.

11. Gadelha, J. M. M., et al. (2024). Tratamento endodôntico em dentes posteriores: sistema de rotação contínua e reciprocante. Brazilian Journal of Health Review, 7(3), e69924.

12. Jhamb, S. (2015). Internal resorption of maxillary central incisor: A case report. Research & Reviews: A Journal of Dentistry, 6(3), 31–34.

13. Haapasalo, M., & Endal, U. (2006). Internal inflammatory root resorption: The unknown resorption of the tooth. Endodontic Topics, 14, 60–79.

14. Koehne, T., et al. (2020). Radiological and histopathological features of internal tooth resorption. In Vivo, 34(4), 1875–1882.

15. Laux, M., Abbott, P. V., Pajarola, G., & Nair, P. N. R. (2020). Apical inflammatory root resorption: A correlative radiographic and histological assessment. International Endodontic Journal, 33(6), 483–493.

16. Lin, S., Moreinos, D., Kaufman, A. Y., & Abbott, P. V. (2022). Tooth resorption–Part 1: The evolvement, rationales and controversies of tooth resorption. Dental Traumatology, 38(4), 253–266.

17. Madani, Z., Moudi, E., Bijani, A., & Mahmoudi, E. (2016). Diagnostic accuracy of cone-beam computed tomography and periapical radiography in internal root resorption. Iranian Endodontic Journal, 11(1), 51–56.

18. Patel, S., Dawood, A., Ford, T. P., & Whaites, E. (2007). The potential applications of cone beam computed tomography in the management of endodontic problems. International Endodontic Journal, 40(10), 818–830.

19. Patel, S., Kanagasingam, S., & Pitt Ford, T. (2009). External cervical resorption: A review. Journal of Endodontics, 35, 616–625.

20. Ramos, A. C. (2024). Reabsorção radicular interna em pré-molar inferior: Relato de caso clínico. Journal of Multidisciplinary Dentistry, 12(1), 206–212.

21. Rodrigues, L. G., et al. (2022). Revisão da literatura: Reabsorção radicular interna. Revista Ibero-Americana de Humanidades, Ciências e Educação, 8(5).

22. Travassos, R. M. C., et al. (2024). Reabsorção interna no terço cervical e médio do incisivo superior esquerdo. Revista Aracê, 6(2), 944–956.

23. Tronstad, L. (1988). Root resorption—etiology, terminology and clinical manifestations. Endodontics & Dental Traumatology, 4, 241–252.