Endodontic retreatment and surgical complementation on a tooth with persistent fistula: case report

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ABSTRACT

Introduction: Biological chemical preparation represents a fundamental step, as it promotes asepsis of the complex root canal system, enabling a biological environment favorable to the process of healing and repair of the periapical tissues. However, failures can occur in endodontic treatment and retreatment teeth, where surgical intervention is often indicated in these cases. **Description:** The patient, a 32-year old man, melanoderma, presented at the school clinic of a School of Dentistry in a city in Bahia, with a chief complaint of "blistering of the gums and bitter taste in the mouth." Clinical examination revealed the presence of composite resin restoration on the mesial and palatine surfaces, and an active intraoral fistula in the vestibular region near the apex of tooth 22. By means of clinical, radiographic, pulp sensitivity tests and sinus tracking, a diagnosis of completed endodontic treatment was established, and periapical diagnosis of a chronic apical abscess. Afterwards, endodontic retreatment was indicated, consisting of two sessions of intracanal medication with calcium hydroxide, followed by an exploratory surgical intervention. **Results:** The proposed treatment protocol was effective. Clinical and radiographic success with healing of the active intrabuccal fistula and repair of the periapical tissues, as well as reestablishment of esthetics and dental function, was verified, in a period of twenty six months follow-up. At present, the patient is being followed-up semi-annually. **Conclusion:** it is necessary to emphasize the importance of safely performing reliable endodontic planning and prognosis, as well as follow up of the case, with periodic clinical and radiographic control.

Keywords: Endodontics. Root canal filling materials. Oral surgical procedures.

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Introduction

The purpose of endodontic treatment is to maintain a tooth that may have irreversible pulp inflammation or pulp necrosis, with or without the presence of periapical lesion.[1,2,3] The main objective of this treatment, performed by means of chemico-mechanical preparation, is to promote complete asepsis of root canal systems, by eliminating vital or necrotic pulp tissues and microorganism, thereby making it feasible to create a biological environment that favors the process of cure and repair of the periapical tissues.[1-4]

To achieve this, there are many decisive factors in evaluating the results of diagnosis that must be considered relevant, with the technical value of the obturation being a decisive and important step. Clinical and radiographic follow-up of endodontic treatment is generally performed to evaluate the success of the proposed therapy, however, failure may be manifested by some clinical signs, such as the presence and/or persistence of intraoral fistulas. The prognosis of endodontic treatment helps in the decision-making process and must be considered at the time of planning the therapy, since inadequate removal of bacteria from the root canal is the main, but not only factor contributing to failure of this treatment.[7,8,9]

There are cases in which the prognosis is doubtful and treatment planning may vary significantly. When the first endodontic treatments fails, re-treatment is the option most indicated, in addition to showing the best cost-benefit ratio.[2,4,9] Whereas, it may have a doubtful and unfavorable prognosis.[10] In some situations, radiolucence in the apical region of endodontically treated teeth demonstrates failure in the conventional endodontic procedure, and even teeth that do not have radiographic images compatible with the presence of periapical lesion may be infected. In addition to this treatment being long (time consuming), expensive, and constantly susceptible to re-treatments, the failure rate is considerably higher than that expected.[3] However, in teeth that have been submitted to endodontic re-treatment and have not healed, and the treatment plan proposed has not obtained a successful outcome, surgical intervention is frequently recommended. The success rate of the above-mentioned re-treatment associated with surgery is higher than that of non-surgical endodontic re-treatment.[2,4,10-12]

The cracks in roots may lead to fractures and are also pointed out as one of the etiological factors of unsuccessful endodontic treatment, due to the weakening of the root structure caused by the cracks.[13-15,17] This weakening is due to dehydration of dentin, loss of mineralized tissue, excessive pressure applied during the obturation procedures and undesirable side-effects of the intracanal irrigation solutions.[1] Cone beam computed tomography (CBCT) may be indicated, with the purpose of identifying possible cracks, however there is a great limitation with the presence of artefacts, and these may mask the possible crack and make it difficult to diagnose. This was the reason why the exam was not indicated for the case in this report, and thus the option taken was to perform exploratory surgery to enable diagnosis.[16] Therefore, it is common to resort to exploratory surgery - not for therapeutic purposes - but with the aim of visualizing a possible crack, fracture, or even when there are doubts with regard to the diagnosis.[14,18,19] It may be imperative to perform this surgery to help with establishing the prognosis and programing the treatment. Thereby, the extension of the damage may be estimated and the probability of a feasible treatment can be more accurately analyzed by means of surgical exhibition and direct visual exam of the site.[20]

Based on these presuppositions, the aim of this study was reporting a clinical case of endodontic re-treatment associated with a surgical approach to the management of a maxillary left lateral incisor that had a persistent fistula and extensive periapical lesion.

Case report

This clinical case report was submitted to and approved by the Research Ethics Committee of the Faculdade Independente do Nordeste (FAINOR) in Report No. 03275018.9.0000.5578. The patient, a 32-year-old man, melanoderma, sought dental attendance at the Dental School clinic of municipality in Bahia, with the main complaint of a "lump in the gum and bitter taste in the mouth". His medical history was not relevant. On clinical exam, the maxillary left lateral incisor (22) had an extensive unsatisfactory resin composite restoration, and an active fistula in the region at the bottom of the vestibule close to the periapex (Fig 1). Pulp sensitivity, vertical, and horizontal percussion tests and apical palpation showed

negative responses. The tooth was physiologically mobile, and there was a pseudo periodontal pocket 6 mm deep at the disto-vestibular site, due to gingival hyperplasia (Fig 2). In the study radiographic exam (Fig 3), the endodontic treatment exhibited a satisfactory quality of obturation, and the test for tracing the fistula directed the gutta percha cone to the periapical region of tooth 22 (Fig 4). Therefore, the diagnoses established were endodontic treatment concluded and periapical [tissue] suggestive of chronic apical abscess, respectively. The treatment proposed, and agreed to by the patient, was non-surgical endodontic treatment.

During the first session, endodontic access to tooth 22 was obtained with a high speed bur KG #1014 HL (Medical Burs, Cotia, Brazil). The entire procedure was performed under absolute isolation, and for this purpose a Rubber sheet (Madeitex, São José dos Campos, Brazil), foldable arch (Maquira, Maringá-PR, Brazil) and clip 212 (KG Sorensen, Cotia, Brazil) were used. After this, by means of chemical-mechanical preparation, the operator proceeded with removal of the gutta percha with the aid of a natural orange peel oil solvent (Lenza Farmacêutica, Belo Horizonte, Brazil) and 2.5% sodium hypochlorite irrigant solution (Lenza Farmacêutica, Belo Horizonte, Brazil). Gates Glidden burs 4, 3 and 2 (Dentsply Maillefer, Ballaigues, Switzerland) respectively, were used in the crown-down direction until 2/3 of the root canal working length was reached. The instrumentation technique was the progressive crown-down type performed with manual K-type files (Dentsply Maillefer, Ballaigues, Switzerland) up to file #60 at the working length (WL) 1 mm short of the apical foramen, and foraminal patency with precurved K 15-type file in the distal palatine direction at the real working length of the tooth (RWL). The canal was dried with standardized absorbent paper cones 60 (Dentsply Maillefer, Ballaigues, Switzerland) and as intracanal medication, Callen PMCC (SSWhite Duflex, Rio de Janeiro, Brazil) was used for 30 days; coronal dual sealing with coltosol (Vigodent, Bonsucesso, Brazil) and glass ionomer restorative cement (SSWhite, Rio de Janeiro, Brazil). In the second session, the patient returned for attendance, however, the fistula still persisted. In a new radiographic tracing exam, the gutta percha cone again confirmed the periapical region of tooth 22 (Fig 5). Root canal instrumentation was performed again, under copious irrigation with 2.5% sodium hypochlorite, 17% EDTA (Biodinâmica, Paraná, Brazil) for 02 minutes, drying of the canal and intracanal medication with Calen PMCC for 45 days.

In the third session, the fistula still persisted without any successful development in relation to healing of the fistula. This was a resistant infectious process and therefore, based on the presuppositions that computed tomography had limitations with the presence of artefacts and probably, if there were a crack, it could be masked by the presence of these artefacts. Moreover, in order to minimize the radiation doses, we proceeded with exploratory surgery for diagnosis, due to the suspicion of a possible root crack, since this procedure was indicated for cases of doubtful diagnosis. For exploratory surgery, an intrasulcular incision was made using a surgical blade 15C (Swann Morton, Sheffield, England). After this, two divergent relaxing incisions were made along the long axis of teeth 21 to 23. The total flap extended up to the apical portion of the teeth for approximately 6 mm. After exposure of the vestibular bone plate, bone loss was detected in the cervical and apical thirds (Fig 6) and presence of a purulent exudate was observed in the periapical regions (Fig 7). Clinical evaluation was performed with a periodontal probe (Hu-Friedy, Hot Springs, USA) without recording periodontal compromise. In the periapex, the presence of tissue with cystic characteristics was verified (Fig 8). Once the possibility of a root crack was discarded, advantage was taken of the surgical time to perform complete excision of the periapical lesion (Fig 9), by means of curettage with Molt (Thimon, São Paulo, Brazil) and Gracey, 5-6 (Hu-Friedy, Hot Springs, USA) curettes, and drainage of the exudate. The excised tissue was sent to the laboratory where a biopsy was performed; and the result showed that the lesion was a root cyst. The area was irrigated with sterile physiological solution (Eurofarma, Ribeirão Preto, Brazil) and the area was induced to bleed in order to use the clot as a growth factor for bone neoformation.[21] Subsequently, sutures were performed with simple stitches using nylon thread 4.0 (Procare, São Paulo, Brazil). On conclusion of the procedure, 500 mg of Sodium Dipyrone every 6 h for 2 days, 100 mg of Nimesulid every 12 h for 5 days and 500 mg of Amoxicillin every 8 h for a period of 7 days were prescribed. The stitches were

removed after 10 days, when complete healing of the intraoral fistula (Fig 10) and remission of the symptoms were observed. The result of the histopathological exam confirmed the diagnosis of periapical cyst.

In the fourth session, obturation of the root canal was proceeded with by the thermoplasticized technique with vertical hydraulic compression of the accessory cone (recommended by De Deus),[22] with gutta percha cone M (Odous De Deus, Belo Horizonte, Brazil), endodontic cement Sealer 26 (Dentsply, Pirassununga, São Paulo, SP Brazil) and a resin composite restoration (3M Company, Sumaré, Brazil).

Figure 1. Initial clinical examination.

Figure 2. Periodontal probing.

Figure 3. Radiographic study examination.

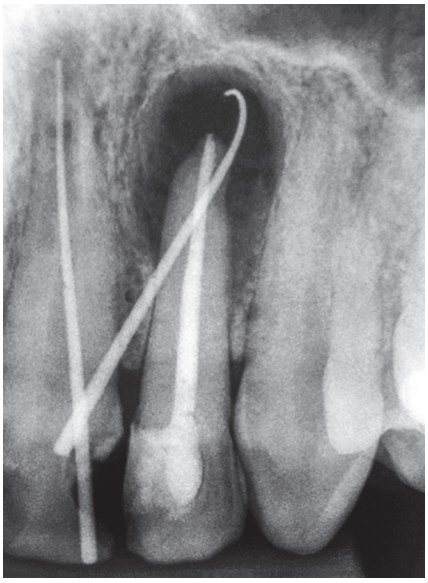

Figure 4. Fistulography I.

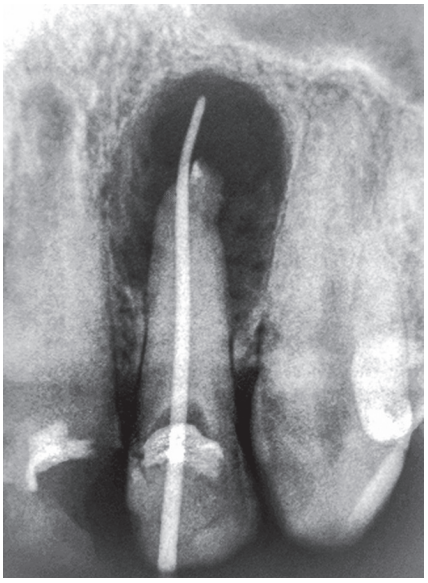

Figure 5. Fistulography II.

Figure 6. Bone loss of the cervical and apical thirds.

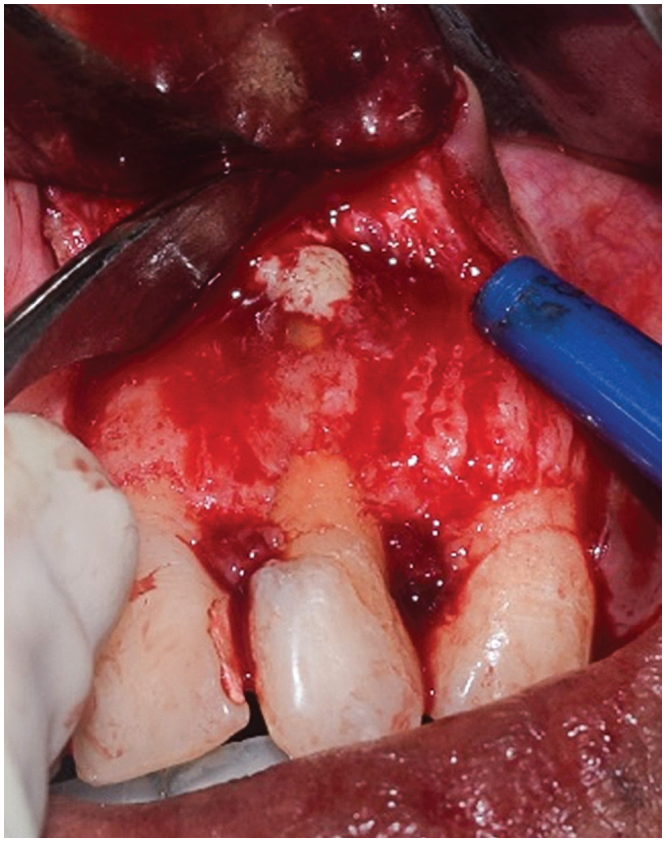

Figure 7. Presence of purulent exudate in the periapical region.

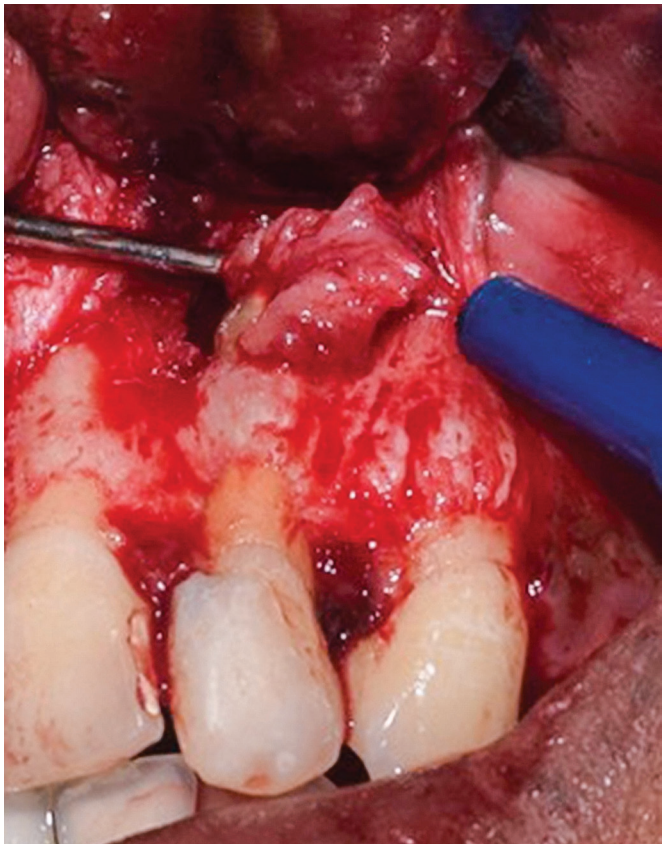

Figure 8. Presence of cystic lesion.

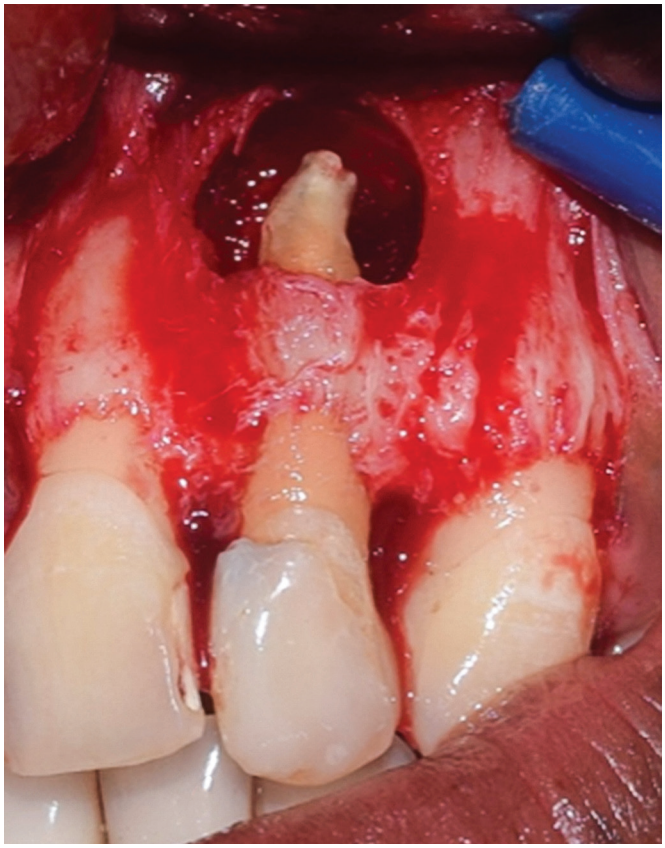

Figure 9. Total excision of the periapical lesion.

Figure 10. Fistula healing.

Results

The patient received three-monthly clinical and radiographic follow-up for a period of 25 months (Figs 11 and 12) and has been rehabilitated, with repair in the periapical region and re-establishment of masticatory functions and esthetics.

Figure 11. Clinical follow up after 26 months.

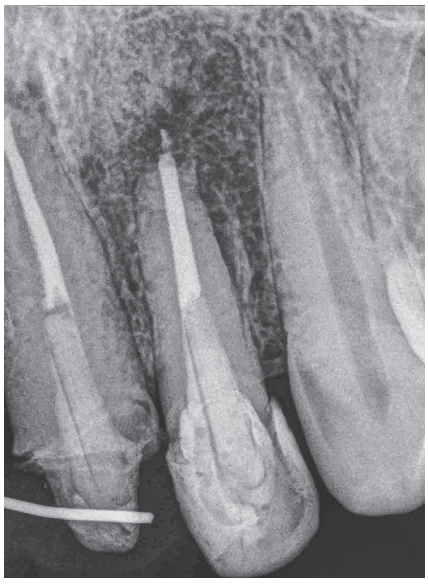

Figure 12. Radiographic follow up after 26 months.

Discussion

In spite of the high success rates, in endodontics diagnosis and planning is challenging, in some situations. Failures may be associated with poorly performed procedures, presence of cracks, fractures, resistance of microorganism, even when the radiographic exam has shown obturation of the root canal to be satisfactory.[17,23,24]

The presence of beam hardening artefacts in the computed tomography images (TC) and TCFC may influence endodontic diagnosis when a high-density material is present in the scanned volume, particularly in cases of cracks and/or vertical fractures of roots, because these factors compromise the visualization of dental structures. Moreover, hypodense lines representing beam hardening artefacts may be wrongly diagnosed as root fractures, due to their similar radiographic appearance, leading to incorrect management, and in some cases, unnecessary tooth extraction.[16] Based on these reflections, this was the reason why the exam was not indicated for the case in this report, and therefore, the option taken was to perform exploratory surgery to enable diagnosis.[16]

In the present case, a persistent intraoral fistula was observed, even after two sessions of intracanal medication. Tooth 22 had a periodontal probing depth of 6 mm at the disto-vestibular site, due to gingival hyperplasia. A suspected root fracture led to exploratory surgery for diagnosis being performed, in which it was found that there was no crack in the root, but there was purulent exudate and a cystic capsule in the periapical region. Some microorganisms are resistant even to intracanal medications, and in this case, a probable cause of the conventional endodontic treatment failure could have been the presence of extra radicular biofilm.[10,14,18,19,24]

In the exploratory surgery for diagnosis, advantage was taken of the surgical time and periapical curettage was necessary, in this case for therapeutic purposes to eliminate infection and consequently prevent progression of the pathology.[25] Therefore, in this case report, the periapical lesion with cystic characteristics was completely removed, and the purulent exudate was surgically drained. No apical resection was performed because the reason for the surgery had been exploratory for diagnoses and the canal had not been filled.

In addition to the conventional exams for determining the correct diagnosis of a periapical pathology, there was also biopsy, indicated with the lesioned tissue is surgically removed, as occurred in the description of this clinical case. This exam must be performed, especially when the patient as a large lesion accompanied by a significant quantity of tissue with doubtful characteristics.[26] The tissue excised from the patient had cystic characteristics and was sent to have the biopsy performed with the aim of determining the diagnosis with greater precision by means of the histopathological exam.

Because the exploratory surgery led to the finding that there was no crack or fracture of the root in question, a possible cause for the failure of the conventional endodontic treatment may have been the bacterial resistance to chemical-mechanical preparation, intracanal medication, as previously mentioned, and the presence of extra-radicular biofilm.[10] However, according to the result of the biopsy, the cause of failure could also be attributed to the presence of a cyst in the periapical region.

Endodontic treatment associated with surgery demands continuous follow-up to control the progress of healing. Periapical radiography has constantly been used for judging healing after surgical endodontic treatment, as was done in this case. Supervision for 12 months is frequently accepted as a good recommendation for evaluation the outcome of surgery, and follow-up for a mean period of 23.7 months was classified as being satisfactory for an adequate report.[27] Therefore, it exceeded a category that was sufficient for an appropriate evaluation, since the clinical and radiographic control of the patient in this report was conducted at three-monthly time intervals throughout a period of 26 months.

Considering that in treatment and re-treatment of the root canal, the success of apical surgery is determined by the absence of vestiges of clinical and radiographic symptoms, superior clinical and radiographic results associated with surgical procedures have been reported by some authors.[25] After surgical removal of the periapical lesion, the patient reported no symptoms whatever; there were no further clinical signs, and healing of the fistula and repair of the periapical tissues occurred.

Conclusion

The association of endodontic re-treatment and surgical approach was effective as a therapeutic protocol for the clinical and radiographic success of the clinical case. During the follow-up period of 26 months, clinical success was found with the healing of the intraoral fistula, and radiographic success with repair of the periapical tissue, in addition to re-establishment of esthetics and function of the teeth. The patient will continue to be followed up with regular clinical and radiographic control exams.

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