Case Report

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MANAGEMENT OF RADIOLUCENT LESIONS OF ENDODONTIC ORIGIN: ABOUT A CLINICAL CASE

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ABSTRACT:

Radiolucent lesions of endodontic origin are periradicular lesions which can have several localizations and several sizes but root canal infection remains their common point.

Histological studies on extracted necrotic teeth presenting periradicular radiolucent images have shown that in 90% of cases it is either a granuloma, an epitheliogranuloma or a pocket cyst whose treatment consists of an endodontic disinfection by orthograde procedure followed by a root canal filling, then hermetic and functional coronal restoration was performed.

The introduction of clinical and radiographic monitoring makes possible to identify cases of failure of endodontic orthograde therapy that require second-line surgical treatment after endodontic disinfection which could only be beneficial for periapical healing.

Key Words: radiolucent lesions, pulp necrosis, endodontic orthograde treatment

INTRODUCTION:

Radiolucent lesions of endodontic origin have a wide variety of clinical forms, including granulomas, epithelio-granulomas, pocket cysts, and true cysts. They have periradicular localizations, namely periapical, latero-radicular, or in the root furcations.[1]

These lesions may be associated with either iatrogenic endodontic treatment or pulpal necrosis but the intracanalar infection remains their common point.

This endodontic infection is characterized by a bacterial polymorphism, confined in the intracanal space and escapes all the defenses of the body. These bacteria in the intracanal position send their toxins and degradation products through the endo-periodontal communication pathways to the deep periodontium, setting off a periradicular inflammatory reaction that is both defensive and aggressive, leading to the destruction of the periradicular periodontium.[2,3]

Histological studies have shown that in 90% of cases of peri-radicular radiolucent lesions, it is either a granuloma, an epithelioruloma or a pocket cyst whose healing is obtained only by nonsurgical endodontic treatment, more conservative than periapical surgery.[4- 6]

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Through a clinical case, we will focus on the possibility of healing of a periapical radiolucent lesion by orthograde endodontic therapy.

CASE DETAIL:

This is about a 30-year-old patient, in good general health, referred by a colleague for treatment of the first left mandibular molar (tooth #36#) after a fortuitous discovery of a radiolucent periapical image following the taking of an X-ray.

The patient states that he had a history of abscess related to this tooth #36# which disappeared after taking antibiotic therapy.

The exobuccal examination is without any particularity, the endobuccal examination shows to the inspection a defective restoration to the amalgam with a recurrence of caries on the 36 (Figure 1) and satisfactory restorations on the 35 and the 37.

Pulp sensitivity tests are positive on the 35 and are negative on the 36. The palpation and the axial percussion are slightly sensitive on the 36. The test of the shock back is negative.

Retro-alveolar radiography shows defective restoration with the amalgam, in relation to the pulp, and a circumscribed radiolucent image surrounding the apices of the 36 (Figure 2).

The diagnosis of chronic apical periodontitis in relation to 36 has been made with the need to perform endodontic orthograde therapy.

After setting up the rubber dam, the removal of the amalgam, the access cavity was made.

Passive canal exploration was done under 2.5% sodium hypochlorite (Chloraxid 2%, Cerkamed, Poland) irrigation using an EDTA chelating gel (Glyde, Densplay maillefer, Switzerland).

After elimination of coronal interferences, a radiographic determination of the work length was made (Figure 3).

Subsequently, a chemo-mechanical root canal preparation was performed according to the coronoapical technique under irrigation with sodium hypochlorite, alternating with a chelating gel with EDTA. An intracanal dressing with a calcium hydroxide in the form of a magistral preparation: “pure calcium hydroxide (Pervest Denpro, Germany) with distilled-water” was placed.

The access cavity was sealed with a temporary restorative material (IRM, Dentsply, Brazil).

The patient was seen again after 3 weeks for further treatment, the root canal filling was not made in the session because of the persistence of serosities related to the inflammatory state of the periapex. Again, an intracanal dressing with calcium hydroxide in magistral preparation was

performed to neutralize the acidosis of the inflammatory state of the periapex.

The patient was seen again 3 weeks later, the serosities were still present. As a result, the calcium hydroxide was returned to the root canal according to the same protocol mentioned above.

After 3 sessions of calcium hydroxide at intervals of 3 weeks each, we were able to obtain a dry root canal; and an asymptomatic tooth on percussion and palpation and the achievement of canal filling was decided. Before completion of this one, a rinse with 1 ml of EDTA (EDTA 17% Aqueous Chelating Agent, Vista Dental Products, US) was done followed by a final irrigation with 2.5% sodium hypochlorite.

Root canal filling was performed by thermomechanical technique with the gutta condensor (Mac Spadeen, Densplay Maillefer, Switzerland) combined with lateral condensation in the apical third of the canal (Figure 4 and 5).

A coronal sealed and functional restoration was performed in the following session, using a laminated technique: Glass ionomer (Riva self cure, SDI, Australia) / Composite (Herculite Classic Microhybrid, Kerr, Italy) (Figure 6).

Clinical and radiological controls were instituted to follow the evolution of the periapical radiolucent lesion.

At 6 and 9 months the tooth is asymptomatic clinically. The X-ray examination (Figure 7 and 8) shows the beginning of bone repair.

At 12 months (Figure 9), there is a complete bone repair around the apices of the #36# and even a periodontal ligament healing objectified by the presence of a lamina dura.

DISCUSSION:

Periradicular radiolucent lesions of endodontic origin are lesions associated with pulp necrosis or defective endodontic treatment, which may trigger chronic apical periodontitis during which a state of equilibrium between the organism at the level of the periapical region and the pathogen in the intracanal position. This state of equilibrium can last for months and even years without any symptomatology, and the discovery will be fortuitous during a routine radiographic examination or during an infectious warming in case of secondary abscess.[1]

Faced with the periapical radiolucent image, the question arises: is it necessary to treat the tooth with nonsurgical endodontic treatment or to perform surgical treatment?

Histological studies on necrotic teeth, extracted with radiolucent periapical images.[4-6] showed that in 90% of cases it is: a granuloma, an epithelio-granuloma, or a pocket cyst, whose treatment is orthograde endodontic procedure; and only 10% of cases have

a true cyst that requires surgical treatment.

Therefore, in the presence of a necrotic tooth with a peripapical radiolucent image, it is advisable to start treatment with orthograde endodontic therapy and to establish clinical and radiographic follow-up to assess the need for surgical treatment.[7-9]

Orthograde endodontic therapy involves several stages: endodontic disinfection, sealed root canal filling, hermetic and functional coronal restoration, and the establishing of clinical and radiographic follow-up.

Endodontic disinfection: The intracanal flora is characterized by a bacterial polymorphism, 88 bacterial strains were taken from the infected root canal systems, with a number of 10^2 to 10^8 bacteria per root canal.[2,10] These bacteria are organized in biofilm in the ramifications, isthmus, tubili.[3] So in order to control this bacterial diversification, endodontic disinfection uses two means namely mechanical debridement using mechanical instrumentation of root canal preparation, associated with a chemical disinfection by an irrigation solution.

The coronoapical technique is the currently accepted technique for canal disinfection for its many advantages.[11]

This mechanical preparation must be done in combination with a chemical disinfection using a 2.5% concentrated sodium hypochlorite, which is a compromise concentration between efficiency and toxicity. Its action time is 10 minutes and it must be renewed frequently after passing each instrument since it undergoes saturation in the presence of organic material.[12]

In order to optimize the disinfection, a 17% concentrated EDTA chelating solution can be used in final rinsing, combined with ultrasonic activation, which will dissolve the smear layer.[12,13]

Some authors propose the use of a Chlorhexidine solution of 0.1 to 2% in final rinse for its broad-spectrum bactericidal action and also for its residual effect which is 2 weeks.[14]

At the end of the chemo-mechanical preparation, the bacterial reduction is more than 85%. Obtaining a sterile canal is impossible, and the residual bacterial portion can be inactivated by sealed root canal filling and coronal restoration that will deprive it of organic substrate necessary for its survival.[15]

However, to perform a root canal filling in the same session, the tooth must be asymptomatic and the canal without seep. In this case, the canal filling will be postponed and the setting up of an intracanal medication is essential.

Calcium hydroxide still finds its place in endodontics. Certainly, its antibacterial action is questioned recently since it

has no action on certain bacteria such as *Enerococcus foecalis, Actinomyces Israeilii*. Nevertheless, it is used for its anabolic, anti-inflammatory, sedative and osteogenic effect and also it constitutes an intracanal physical barrier preventing the bacterial multiplication.[16,17]

Another molecule can be used in intracanal medication is the 2% Chlorhexidine gel. It has a bactericidal action on bacteria resistant to calcium hydroxide by remanence effect for at least two weeks, but its parietal elimination is difficult and it still persists residues that will alter the quality of the seal thereafter.[14,17]

***Sealed root canal sealing*:** A three-dimensional root canal filling seals the endodontic system which will maintain the disinfection state achieved by the canal preparation. Good sealing quality is achieved by compacting techniques of gutta percha.[18]

***Hermetic and functional coronary restoration*:** Ensures the durability of the root canal filling. Also, tooth set-up should be initiated as early as possible to stimulate periapex healing.[3]

Clinical and radiographic follow-up: The success of endodontic therapy can be judged clinically by absence of symptoms and radiographically by osteoformation and reconstitution of the lamina dura.[19]

Many studies have shown that 90% of periapical lesions show signs of healing after 1 year, 50% of which heal completely. The majority of lesions heal at 2 years but in some cases the disappearance of the lesion can take 4 to 5 years. But generally the success of endodontic treatment is judged during the first year of follow-up.[19,20]

The reappearance of clinical signs such as pain, signs of infection, or the increase in the size of the periapical image indicates the failure of endodontic orthograde therapy and the achievement of apical surgery will be essential.

The absence of healing can have several causes to know.[1,10]

- Residual intracanal infection due to incorrect disinfection of the endodontic system or leaky seal at the canal filling and the coronary restoration,
- Extra-radicular infection caused by resistant bacteria such as (*Actinomyces israeli* and *arachnia propionica*) which can be found at the periapical level following a septic reflux during the canal preparation or following a root resorption,
- Accumulation of cholesterol crystals at the periapical area,
- Significant overflow of the filling material which will maintain an inflammatory reaction at the periapical area leading to the formation of a foreign body granuloma,

- A true cyst with no relation to the root apex.

CONCLUSION:

Radiolucent periapical lesions of endodontic origin are the result of endodontic infection. They can have many sizes and localizations.

In 90% of cases, the periapical lesion corresponds to a granuloma, an epitheliogranuloma or a pocket cyst whose healing can be observed by a simple endodontic orthograde therapy.

Therefore, in the presence of a periradicular radiolucency image associated with pulpal necrosis, it is advisable to perform first-line orthograde endodontic treatment.

The clinical and radiological follow-up makes it possible to objectify the treatment success and in 10% of the cases of failure, a surgical treatment will be justified.

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FIGURES :

Figure 1: Preoperative photograph showing a defective amalgam restoration with a recurrence of caries on the 36

Figure 2: preoperative radiograph showing defective amalgam restoration in relation to the pulp and a circumscribed radiolucent image in relation to the apices of the 36

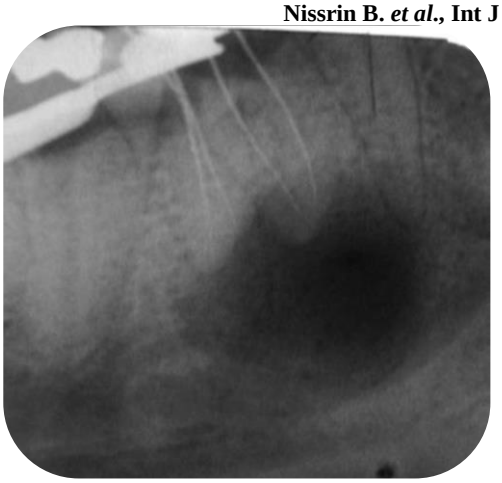

Figure 3: X-ray file in place to determine the length of work

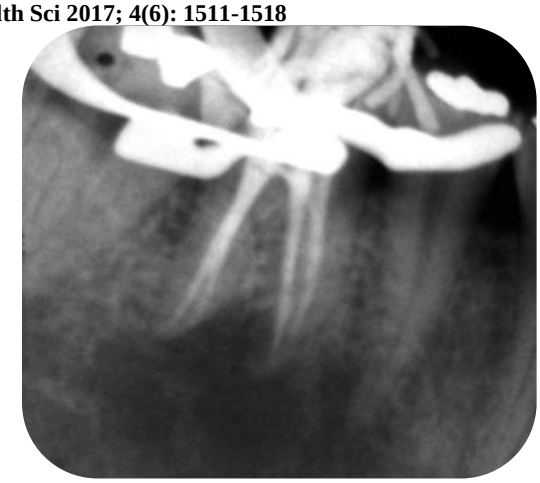

Figure 4: X-ray of canal filling of the apical third by cold lateral condensation

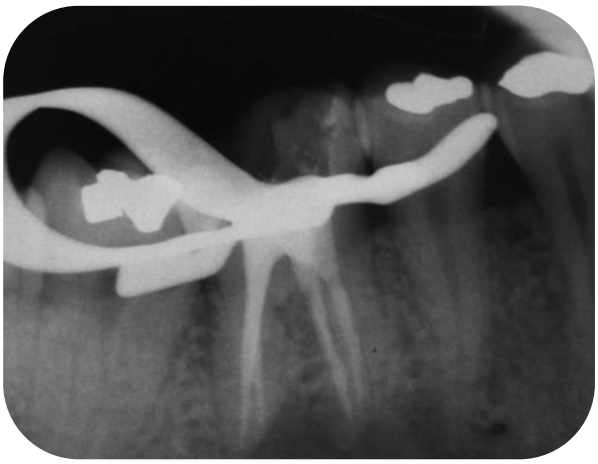

Figure 5: Radiography of the coronal two-thirds canal filling by thermomechanical technique

Figure 6: Coronary restoration with laminated Glass ionomer ciment / composite technique

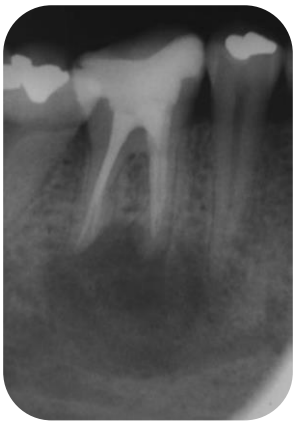

Figure 7: Control x-ray at 6 months showing early bone repair

Figure 8: Control x-ray at 9 months

Figure 9: Control x-ray at 12 months