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ENDO-PERIODONTAL LESION: AN ENDODONTIC APPROACH IN A SERIES OF CLINICAL CASES

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Abstract: An endodontic periodontal lesion is a condition in which a tooth infection extends from the inside of the tooth (the dental pulp) into the periodontal tissues surrounding the root of the tooth. This occurs when an infection in the tooth pulp is left untreated and spreads to the tissues around the root, causing inflammation and damage. These injuries often result from untreated tooth decay, dental trauma, or bacterial infections that invade the inside of the tooth. Symptoms may include pain, sensitivity to heat and cold, swelling in the affected area, bad breath and, in advanced cases, the formation of a tooth abscess. Treatment for an endodontic periodontal lesion usually involves endodontic treatment, also known as root canal treatment, to remove the infected pulp and clean the inside of the tooth. In more advanced cases, additional periodontal treatment may be needed to treat infection in the tissues around the tooth root.
Keywords: Tooth root; Dentistry; Dental Research.

INTRODUCTION

Periodontal and pulp tissues are biologically similar and added to the presence of lateral canals, dentinal tubules, and apical foramen, it is correct to affirm the presence of an intimate relationship between these tissues (ROTSTEIN & SIMON, 2010). There is evidence that this is also a transitory medium for endodontic pathogens to periodontal and/or periodontal tissues to endodontic tissue (RICUCCI & SIQUEIRA JR, 2010; DAS et al., 2020). This communication can be proven based on the similarity of the bacterial profile inside the infected root canal and in the periodontal lesion in samples of combined endo-perio (endodontic-periodontal) lesions (GOMES et al., 2015; ROVAI et al., 2019) .

When there is communication between the periodontal pocket and a periapical lesion resulting from pulp necrosis, what we call an endo-perio lesion is characterized (AL-FOUZAN., 2004). To have good predictability in the treatment of these lesions, it is crucial to correctly classify the lesion, which can be primary endodontic disease, primary periodontal disease, and combined endodontic-periodontal disease, the latter being subdivided into primary endodontic disease with involvement secondary periodontal disease, a primary periodontal disease with secondary endodontic involvement and combined true endo-perio lesion (ROTSTEIN & SIMON, 2006).

A chronic apical lesion can drain through the periodontal ligament, towards the gingival sulcus, or even towards the furcation, in the case of molars, which may or may not be related to the presence of lateral canals in this region (ROTSTEIN & SIMON, 2006). The transit of inflammatory exudate for a long time will evolve into bone loss and localized periodontal pocket formation (BEREZOW & DARVEAU, 2011). This characteristic, associated with the absence of plaque in the region, indicates the presence of a primary endo-perio endodontic lesion (AL-FOUZAN. 2014).

Several periodontal therapies can be indicated in the presence of a pocket, however, determining the causative factor is the starting point for selecting an effective treatment, and removing the cause is crucial for a favorable prognosis (GRAZIANI et al., 2017) The absence of bacterial plaque in the periodontal pocket indicates that the focus of infection is restricted to the root canal, therefore endodontic treatment should be the therapy of choice for the condition (ROTSTEIN & SIMON, 2010).

The objective of this work is to present 3 clinical cases of primary endo-perio endodontic lesions, in which endodontic therapy was the treatment of choice to restore periapical and periodontal health.

CASE REPORT 1

A 16-year-old female patient attended the private office for endodontic evaluation of the lower right first molar. After anamnesis, the main complaint was exacerbated mobility of the aforementioned element, the patient reported no systemic changes or drug allergy. During intra-oral evaluation, the presence of a coronal fracture of tooth element 46 was found.

A cold sensitivity test (endo-ice – Coltene, Altstätten, Switzerland) was performed with a negative result. The presence of sensitivity to vertical and horizontal percussion tests and palpation was also noted. In addition, grade 2 tooth mobility and 16mm periodontal probing between the roots were noted.

The periapical radiographic examination showed an intimate relationship between the crown fracture and the pulp chamber. It also revealed an image suggestive of a periapical lesion extending to the furcation region of the aforementioned element (Figure 1).

Based on the exams, the diagnostic hypothesis was pulp necrosis, associated with the primary endo-perio endodontic lesion, so endodontic treatment was proposed. After anesthesia of the inferior alveolar nerve with lidocaine with 1:100,000 adrenaline (Alphacaine 100, DFL, Rio de Janeiro, Brazil), absolute isolation of the dental element was performed.

Access to the pulp chamber using a high-speed diamond spherical bur nº 1014 (KG Sorensen, São Paulo, SP, Brazil) under constant refrigeration. The mouths of the channels were located with the aid of a straight probe. The auxiliary chemical substance of choice was 2% chlorhexidine gel (Essencial Pharma, Itapetininga, SP, Brazil) and saline solution. Cervical preparation was performed using Gates Glidden brackets nº 2 and 3 (Dentsply Maillefer, Ballaigues, Switzerland), the working length (CT) was obtained using a Flexofile nº15 file (Dentsply Maillefer, Ballaigues, Switzerland), with the aid of an electronic apex locator (Novapex, Forum Technologies, Rishon Le-Zion, Israel), being established in the 19mm distal canal and 20mm mesiobuccal and mesiolingual canals.

The root canals were instrumented using a reciprocating instrument Wave One Gold Large 45/05 (Dentsply Maillefer, Ballaigues, Switzerland) in the mesial canals, and Wave One Gold Large 45/05 plus apical enlargement with a K-File 60/02 hand file (Dentsply Maillefer, Ballaigues, Switzerland) in the distal canal. As an intracanal medication, a cotton ball moistened with tricresol formalin (biodynamics, Ibirapoã, PR, Brazil) was used.

After 14 days, the intracanal medication was removed with the aid of a 40/02 manual file (Dentsply Maillefer, Ballaigues, Switzerland), and abundant irrigation with 2% chlorhexidine gel and saline solution. The canals were dried using sterile absorbent paper tips (MKLife, Porto Alegre, Brazil). The filling was performed with FM gutta-percha cone (Odous de Deus, Belo Horizonte, Brazil) and Ah Plus cement (Dentsply Maillefer, Ballaigues, Switzerland), modified hybrid Tagger technique (Figure 2).

The patient had good hygiene and periodontal health, except for the periodontal pocket located in element 46, so periodontal therapy was discarded. The patient returned for follow-up after 5 months, where he presented no signs and symptoms, mobility, and periodontal inflammation, in addition to a 2mm probing, factors consistent with a healthy periodontium as described by Lang & Bartold (2018). On radiographic examination (Figure 3), new bone formation is noted in the apical region and furcation of the element, a finding that indicates successful endodontic therapy.

Figure 1. Initial periapical radiograph – tooth 46.

Figure 2. Final periapical radiograph – tooth 46.

Figure 3. Control periapical radiograph of tooth 46 (5 months).

CASE REPORT 2

A 19-year-old female patient was referred to a private office for endodontic evaluation of the lower right first molar. After anamnesis, the main complaint was sensitivity to touch on the mentioned element, the patient reported no systemic changes or drug allergy. During intra-oral evaluation, the presence of a coronal restoration with provisional material in dental element 46 was found.

A cold sensitivity test (endo-ice – Coltene, Altstätten, Switzerland) was performed with a negative result. The presence of sensitivity to vertical and horizontal percussion tests and palpation was also noted. In addition, grade 3 tooth mobility and 11mm periodontal probing between the roots were noted (Figure 4). A periapical radiographic view, where a direct relationship was observed between the provisional restorative material and the pulp chamber. It was also possible to observe an image suggestive of a periapical lesion extending to the furcation region of the aforementioned element (Figure 5).

Based on the exams, the diagnostic hypothesis was pulp necrosis, associated with the primary endo-perio endodontic lesion, so endodontic treatment was proposed. After anesthesia of the inferior alveolar nerve with lidocaine with 1:100,000 adrenaline (Alphacaine 100, DFL, Rio de Janeiro, Brazil), absolute isolation of the dental element was performed. After removing the provisional restorative material to gain access to the pulp chamber using a high-speed diamond ball bur no. 1014 (KG Sorensen, São Paulo, SP, Brazil) under constant refrigeration. The mouths of the channels were located with the aid of a straight probe as an auxiliary chemical substance, 2.5% sodium hypochlorite (Bergamaschi Manipulation, Santa Maria de Jetibá, ES, Brazil). Next, cervical preparation was carried out using Gates Glidden brackets nº 2 and 3 (Dentsply Maillefer, Ballaigues, Switzerland), the working length (CT) was obtained using a Flexofile nº15 file (Dentsply Maillefer, Ballaigues, Switzerland) , with the aid of an electronic apex locator (Novapex, Forum Technologies, Rishon Le-Zion, Israel), being established in the 17mm distal canal and 18mm mesiobuccal and mesiolingual canals.

Instrumentation of the root canals using a Reciproc Blue R40 40/06 reciprocating instrument (VDW) in the mesial canals, and K-File manual instrumentation (Dentsply Maillefer, Ballaigues, Switzerland) up to diameter 80/02 in the distal canal. Calcium hydroxide paste, camphorated paramonochlorophenol, and glycerin were used as intracanal medication, as described by Siqueira & De Uzeda (1998). After 14 days, the intracanal medication was removed with the aid of a 35/02 manual file (Dentsply Maillefer, Ballaigues, Switzerland), and abundant irrigation with 2.5% sodium hypochlorite. The canals were dried using sterile absorbent paper tips (MKLife, Porto Alegre, Brazil). The mesial canals were filled with FM gutta-percha

cone (Odous de Deus, Belo Horizonte, Brazil) and Ah Plus cement (Dentsply Maillefer, Ballaigues, Switzerland), modified hybrid Tagger technique. As for the distal canal, due to its large diameter, it was decided to create an apical plug with Mineral Trioxide Aggregate (MTA) (Angelus, Londrina, PR, Brazil), followed by filling the middle and cervical thirds with thermocondensed guttapercha, a technique described by Pereira et al, (2017) (Figure 6).

The patient had good hygiene and periodontal health, with the exception of the periodontal pocket located in element 46, so periodontal therapy was discarded.

The patient returned for follow-up after 6 months, where there were no signs and symptoms, no mobility and periodontal inflammation, in addition to a 1mm probing, factors consistent with a healthy periodontium as described by Lang & Bartold (2018). On radiographic examination (Figure 7), new bone formation can be seen in the apical region and furcation of the element, which shows the success of endodontic therapy.

Figure 4. Periodontal probing – tooth 46. (11mm).

Figure 5. Initial periapical radiograph – tooth 46.

Figure 6. Final periapical radiograph – tooth 46.

Figure 7. Control periapical radiograph of tooth 46 (6 months).

CASE REPORT 3

A 43-year-old male patient was referred to a private office for endodontic evaluation of the lower right first molar. After anamnesis, the main complaint was the presence of suppuration in the gums around the mentioned tooth, the patient reported no systemic changes or drug allergy. During an intra-oral evaluation, the presence of a composite resin coronal restoration was found in the crown of dental element 46, in addition to the presence of inflammation in the gingival tissue adjacent to it.

A cold sensitivity test (endo-ice – Coltene, Altstätten, Switzerland) was performed with a negative result. The presence of sensitivity to vertical and horizontal percussion tests and palpation was also noted. In addition, grade 1 tooth mobility and 14mm periodontal probing between the roots were noted (Figure 8). On periapical radiographic examination, proximity was observed between the restorative material and the pulp diverticulum. It was also possible to observe an image suggestive of a periapical lesion extending to the furcation region of the aforementioned element (Figure 9). Based on the exams, the diagnostic hypothesis was pulp necrosis, associated with the primary endo-perio endodontic lesion, so endodontic treatment was proposed. After anesthesia of the inferior alveolar nerve with lidocaine with 1:100,000 adrenaline (Alphacaine 100, DFL, Rio de Janeiro, Brazil), absolute isolation of the dental element was performed.

Endodontic access was made through the restorative material to gain access to the pulp chamber using a high-speed diamond ball drill nº 1014 (KG Sorensen, São Paulo, SP, Brazil) under constant refrigeration. The mouths of the channels were located with the aid of a straight probe. The auxiliary chemical substance of choice was 2.5% sodium hypochlorite (Bergamaschi Manipulation,

Santa Maria de Jetibá, ES, Brazil). No cervical preparation was performed, following the guidance of the manufacturer of the instrument of choice for instrumentation, the working length (CT) was obtained using a Flexofile nº15 file (Dentsply Maillefer, Ballaigues, Switzerland), with the aid of an electronic apical locator (Novapex, Forum Technologies, Rishon Le-Zion, Israel), being established in the distal canal 23mm, the mesiobuccal canal 24mm and the mesiolingual canal 24.5mm.

After rotational instrumentation with the XP-Endo Shaper 30/04 (FKG) instrument in the mesial and distal canals. No intracanal medication was used, as the treatment was conducted in a single session. The canals were dried using sterile absorbent paper tips (MKLife, Porto Alegre, Brazil). The filling of the mesial canals was performed with a gutta-percha cone of conicity 04 ((MKLife, Porto Alegre, Brazil) and Ah Plus cement (Dentsply Maillefer, Ballaigues, Switzerland) using the single cone technique (Figure 10). The patient presented good hygiene and periodontal health, except for the periodontal pocket located in element 46, therefore periodontal therapy was discarded.

The patient returned for follow-up after 12 months, where he presented no signs and symptoms, no mobility, and no periodontal inflammation, in addition to a 3mm probing, factors consistent with a healthy periodontium as described by Lang & Bartold (2018). On radiographic examination (Figure 11), new bone formation can be seen in the apical region and furcation of the element, which shows the success of endodontic therapy.

Figure 8. Periodontal probing – tooth 46. (14mm).

Figure 9. Initial periapical radiograph – tooth 46.

Figure 10. Final periapical radiograph – tooth 46.

Figure 11. Control periapical radiograph tooth 46 (12 months).

DISCUSSION

The relationship between endodontic pathogens and the periapical lesion was established by Kakehashi et al, (1965), when they showed that in the absence of microorganisms, there is no development of the periapical lesion. Therefore, the removal of endodontic pathogens through root canal treatment is sufficient to promote the repair of the periapical lesion (LOPES et al., 2015). The same should happen in endo-perio lesions whose focus of infection is restricted to the root canal.

However, without the correct diagnosis the patient may be subjected to unnecessary procedures or fail to receive the ideal treatment given their current condition (GRAZIANI et al., 2017). Some measures are taken to reach a correct diagnosis, such as general periodontal assessment of the patient, periodontal probing, pulp sensitivity/vitality test, percussion and palpation test, assessment of root integrity, and radiographic

measurements (AL-FOUZAN. 2014).

The bacterial profile in endodontic lesions is modulated by the presence of periodontal disease (GADÊ-NETO et al., 2019). The opposite also happens, this can be reflected in the similarity of the bacterial communities inside the infected canal with the periodontal pocket (GOMES et al., 2015; ROVAI et al., 2019). Clinically, this characteristic can be noticed when we observe continuous periodontal bone loss and abrupt gingival inflammation in the face of endo-perio lesions, even if the patient's general periodontal status is good.

In the present report, all patients had a good periodontal condition, with periodontal pockets restricted to the region adjacent to the dental elements in which endodontic necrosis was diagnosed. Furthermore, the radiographic examination showed the relationship between periodontal pockets and apical lesions, factors that supported the correct diagnosis and treatment.

The mechanical action of endodontic instruments (LOPES 2015) and the use of irrigating substances in the cases mentioned (hypochlorite and chlorhexidine) (ROÇAS et al., 2016) were of paramount importance to obtain a favorable prognosis since we had in the cases the use of calcium hydroxide, tricresol formalin as intracanal medication and single session, all with abundant use of auxiliary substance in the form of irrigant.

In primary endo-perio endodontic lesions, healing usually occurs after root canal treatment, the fistula previously present in the furcation region should disappear soon after the removal of the infected pulp tissue and the root canals cleaned, shaped and filled (ROTSTEIN & SIMON, 2006). Bone repair in the region must occur from then on, with the dental element being able to return to its function. This can be confirmed in the present clinical report, where not only the reduction of the periapical lesion was observed but also the restoration of periodontal health through endodontic treatment.

CONCLUSION

IT CAN BE CONCLUDED FROM THIS STUDY THAT

The diagnosis of endo-perio injuries is of fundamental importance for the correct management and a favorable treatment prognosis. The clinical cases presented here show that endodontic treatment is the only therapy necessary to treat primary endo-perio endodontic lesions.

CONFLICT OF INTERESTS

The authors declare they do not have any conflict of interest.

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