Case Reports

ENDODONTIC RETREATMENT USING MTA-BASED SEALANTS IN A TOOTH WITH PERFORATION AND PERIAPIAL LESION: A CLINICAL CASE REPORT

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ABSTRACT **DOI: 10.25241/stomaeduj.2017.4(4).art.7**

Introduction: To report an endodontic retreatment with a root perforation and use of reparative cement and filling sealant based on mineral trioxide aggregate (MTA).

Summary: Retreatment in teeth with root perforations can reduce the longevity of the treatment, because it depends on the rapid location and proper sealing, with biocompatible materials that promote tissue repair. A female patient came to the dental office complaining of pain in tooth 36, with an indication of retreatment on it. Radiographically, it presented thickening of the periodontal ligament and periapical lesion in the mesial and distal roots, leading to the diagnosis of chronic apical periodontitis. With the help of an operative microscope, it was possible to find a perforation in the most cervical portion in the furcation region of the mesio-vestibular root canal. To treat this perforation, it was filled with MTA HP Repair, to enable preparation of root canals and subsequent filling with MTA Fillapex, through the Schilder Plus technique and execution of a 12mm relief on distal root for placement of the intra-radicular retainer. Rehabilitation of teeth with root perforations can be performed with MTA-based filling sealants, presenting satisfactory results for repairs in cases of perforations and periapical lesions.

Key learning points:
- Root perforations are accidental unwanted complications that can occur in stages of the endodontic treatment;
- The prognosis for endodontic perforations depends on the size and location of the defect and how quickly the perforated area was sealed with biocompatible material.

Keywords: mineral trioxide aggregate, root canal filling materials, periapical periodontitis.

1. Introduction

Root perforations are accidental unwanted complications that can occur in stages of the Endodontic treatment, as preparation of the access cavity and preparation of the root canal, or as a result of the extension of resorption or iatrogenic procedures.[1] Of these, 53% of iatrogenic perforations occur during the insertion of intra radicular retainers and the remaining 47% are induced during routine endodontic treatment.[2]

One of the most important causes of failure in endodontic treatment is the dental perforation at different places, among which the perforations in the furcation region have the worst prognosis. Perforations lead to inflammatory response in the periodontal region, which can cause irreversible damage of the periodontal ligament or even dental loss.[3]

The prognosis for endodontic perforations depends on the size and location of the defect and how quickly the perforated area was sealed with biocompatible material. A variety of materials such as zinc-oxide eugenol, amalgam, Cavit, composite resin, glass ionomer and mineral trioxide aggregate (MTA) have been suggested to seal these perforations.[2,3,4]

The introduction of MTA by Torabinejad in 1993 had a great impact on the endodontic practice, increasing the treatment success rates. In addition to its superior sealing properties, studies have shown that MTA has excellent biocompatibility when placed in contact with the periradicular tissues.[2,5] It was initially recommended as filling material, but

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Figure 1. Initial Radiography.

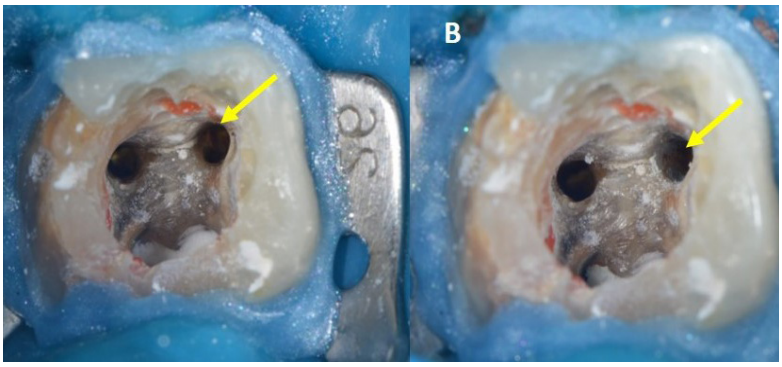

Figure 2. A. Initial aspect of the perforation; B. Aspect after placement of MTA HP Repair.

Figure 3. Radiographic aspect after the placement of MTA HP Repair in the perforation.

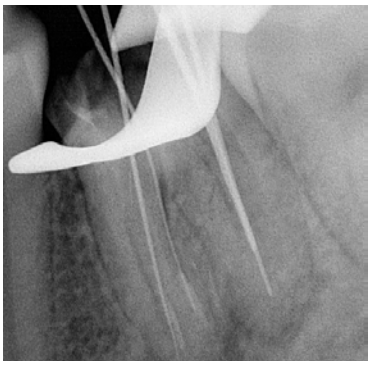

Figure 4. Odontometrics radiography.

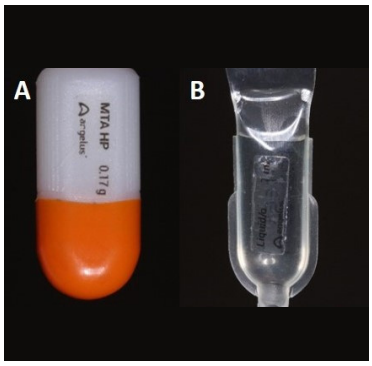

Figure 5. Product used for sealing the perforation - MTA HP Repair Sealant (Angelus Indústria de Produtos Odontológicos) A. Powder capsule; B. Liquid (distilled water).

Figure 6. Figure 6. Manipulation of MTA HP Repair reparative sealant. A. Powder; B. Liquid; C. Insertion with MTA instrument.

also features high success rates in pulp capping, pulpotomy, apical barrier formation in open apices and root perforation repair.[6]

The purpose of this clinical case report was to report an endodontic retreatment with presence of root perforation in the furcation region, in which reparative cement and filling sealant based on mineral trioxide aggregate (MTA) were used.

2. Clinical Case Report

A female patient came to the dental office complaining of pain, for retreatment of element 36. Radiographically, it presented thickening of the periodontal ligament and periapical lesion in the mesial and distal roots, leading to the diagnosis of chronic apical periodontitis (Fig. 1).

Through radiographies with angulation to mesial and distal it was possible to check the presence of 4 canals. In the first session, the following actions were performed: a crown opening, location of the canals and removal of the filling material with an ultrasound flat tip Irrisonic (Helse Dental Technology, São Paulo, Brazil). After 3 days, the patient returned and with an operative microscope it was possible to locate the perforation in the most cervical portion in the furcation region in the mesio vestibular root, which was covered by red resin (Fig. 2A). Intra canal medication based on calcium hydroxide (Biodinâmica Química e Farmacêutica, Paraná, Brazil) and a saline solution were used.

In the next session, the deviation in the mesio canal was filled with MTA HP Repair (Angelus Indústria de Produtos Odontológicos, Paraná, Brazil) and glass ionomer (S.S. White Duflex, Rio de Janeiro, Brazil) to enable performing the instrumentation of canals avoiding the expansion of the perforation (Fig. 3).

In the same session, the remaining gutta-percha present in the distal canal was removed, electronic odontometrics was performed, and the tooth received calcium hydroxide intra canal medication (Biodinâmica Quimica e Farmacêutica, Paraná, Brazil).

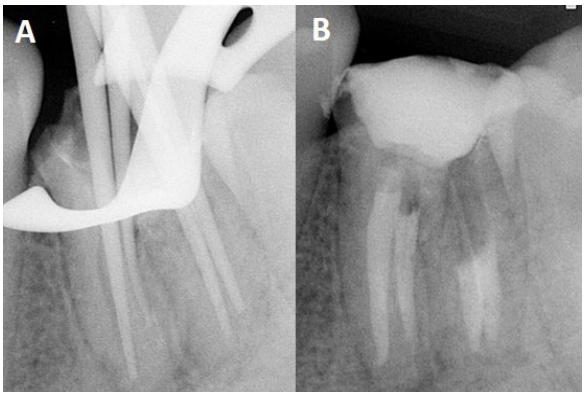

Figure 7. A. Try in of the gutta-percha points; B. Final radiographic aspect after filling.

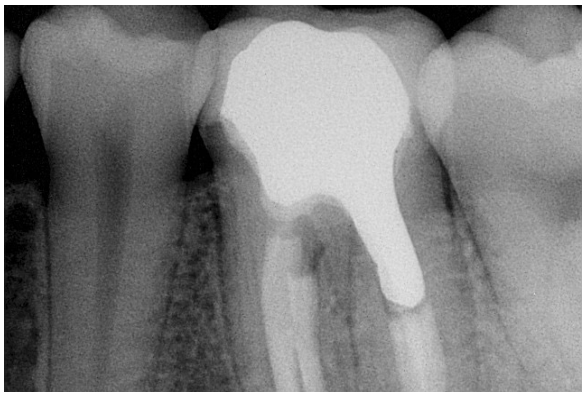

Figure 8. Follow-up radiography after 7 months.

Within 4 weeks, patient asymptomatic, the working length was confirmed via apical and radiographic locator (Fig. 4) and the perforation was filled again with MTA HP REPAIR (Angelus Indústria de Produtos Odontológicos, Paraná, Brazil) (Figs. 5 and 6) in order to increase the perforation protection (Fig. 2B). Medication was changed inside the canals.

After a month with medication, the total biomechanical preparation was performed, with the Oregon technique and intra canal medication was provided again. The patient returned after 15 days without pain, with the presence of periapical repair, and the canals were filled with gutta-percha and sealant (Fig. 7). MTA Fillapex (Angelus Indústria de Produtos Odontológicos, Paraná, Brazil) was applied using the Schilder Plus technique at the CDC adhesion level, and the distal canal was left with a 12mm relief for the placement of intra radicular retainer

After 7 months of follow-up, the patient does not present, clinically, pain symptoms and radiographically there was repair of the bone resorption in the mesial and distal roots (Fig. 8).

3. Discussion

The purpose of repairing a root perforation is to maintain a healthy periodontal, in juxtaposition with the perforation place, so that it is free of persistent inflammation and preventing or reestablishing the periodontal ligament insertion to nearby tissues. The success of the perforation repair depends on a good sealing of the perforated location with a biocompatible material and that it maintains the health conditions of the periodontal ligament.[7]

Some authors report that MTA can be used to repair root perforations with predictable results, since in examined cases, teeth did not present pathological changes after 12 to 45 months, and more than 82% of treated patients exhibited radiographic success with absence of pain.[8,9,10]

According to Siew 2015, in a revision conducted with a total of 188 perforations included in the analysis, a success rate of 72.5% was concluded, regardless of the materials used, and of 80.9% for the use of MTA. These results suggested that non-surgical repair using MTA material can result in a higher success rate compared to other materials.[7,11]

What differentiates MTA from other materials is its ability to promote the regeneration of the sealant, thereby facilitating the regeneration of the periodontal ligament. Therefore, it establishes an effective sealing of root perforations and can be considered a potential repair material that improves the prognosis of perforated teeth that otherwise would be compromised.[2,11]

Therefore, the choice of the material used in this clinical case both for the perforation repair and the filling sealant was based on the most recent literature. The radiographic follow-up shows that the success of the case represents what is found by other writers, with absence of pain, or periapical changes.

The ability to promote a proper sealing is a primary factor in the attempt to restore periodontal health,[2] and this must consider the technical skill and professional features and characteristics of the material used. The new formulations of the restorative sealant based on MTA facilitated the insertion of the material, mainly in small cavities or difficult access.

Burst perforations interfere in the dental element prognosis. The mesio vestibular root of the upper molars and the mesial root of the lower molars are highly susceptible to this type of perforation due to the thin root walls.[1] In addition to the limitation of sealing, the difficulty in determining the perforation location, its size and shape can be limiting for the case. Using microscope surgery is an effective tool in the detection and treatment of root perforations, and access to this technology was essential for the success of this case.[12]

4. Conclusion

The reparative and filling sealant based on MTA, in its composition, has effective and satisfactory results in the treatment of root perforations, mainly when associated with technologies such as the operating microscope.

Authors' Contributions

Elaboration of the article - NR; Prosthetic rehabilitation of the clinical case, Literature review - LN; Literature review, Photos of the clinical case - AM; Implementation of the clinical case - CM; Revision of article to the guidelines - GR; Implementation of the clinical case, Final revision of the article - MA.

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Questions

Which perforations have the worst prognosis?

❑a. Apical region;
❑b. Furcation region;
❑c. Cervical region;
❑d. Middle region.

Which materials have been suggested to seal perforation?

❑a. Amalgam, glass ionomer, MTA;
❑b. Coltosol;
❑c. Ceramic;
❑d. Zirconia.

In which area was the perforation identified?

❑a. Mesio buccal canal;
❑b. Distal canal;
❑c. Mesio lingual canal;
❑d. Mesial canal.

Which material was used in order to repair the perforation?

❑a. Amalgam;
❑b. MTA;
❑c. Glass ionomer;
❑d. Cavit.