Endodontic retreatment with root perforation using MTA repair cement and MTA based sealer.

Nayara Rodrigues Nascimento Oliveira Tavares, Jéssica Monteiro Mendes, Alexia da Mata Galvão, Maria Antonieta Veloso Carvalho de Oliveira.

Introduction

Perforation is an artificial communication between the root canal system and the supporting tissues of the teeth, which complicates treatment and deprives the prognosis if not properly treated. Root perforations can occur pathologically as a result of resorption and caries, or iatrogenically during some steps of root canal treatment (Kakani et al 2015).

MTA consists of fine hydrophilic particles of tricalcium silicate, tricalcium aluminate, tricalcium oxide silicate oxide, calcium sulfate dihydrate, tetracalcium aluminate, and small amounts of mineral oxides (bismuth oxide). Its composition derives from Portland cement and has been extensively studied since it was officially approved for dental use in 1998 (Kakani et al 2015; Tawil et al 2015).

Perforations generally result from iatrogenic effects in which communication between the root canal and periradicular tissue occurs during coronary access or instrumentation. Perforations can also occur as a result of internal resorption where the entire thickness is affected by the root resorption process. The excellent sealing ability and biocompatibility of MTA allow it to be used as repair material with predictable and favorable results (Tawil et al 2015).

The most recent MTA formulations exhibit reduced setting time. They are also offered in containers, which allow more controlled distribution and have the same required properties (Tawil et al 2015).

Initial studies with MTA reported success rates of 56% over 41 months. In a more recent in vivo study using MTA as a sealing material, over 85% of cases achieved repair of the perforation. MTA provides effective sealing of long-term perforation and it is an extremely biocompatible material (Mente et al. 2010; Buttel et al 2013; Mente et al 2014).

Although there is still no material with all ideal characteristics in perforations' treatment, MTA is the most favorable material, with adequate sealing in long term, being the first option in these cases. The purpose of this article is to present a clinical case of retreatment with perforation, using MTA-based cement.

Case report

A 42-year-old female patient came to the private practice complaining of spontaneous pain on tooth number 30 (FDI 46). According to the patient file, endodontic retreatment had been performed on it. During the clinical exam, the tooth presented positive vertical and horizontal percussion tests. Radiographically it showed a lesion in the furcation region, and endodontic treatment (Figure 1).

The restoration was removed using a round and conical safe tip bur (Endo Z, Angelus Industria de Produtos Odontológicos S/A, Paraná, Brazil). It was possible to verify the presence of whitish material in the mesial root (Figure 2A). The material was removed and the perforation was visualized in the distal portion of the mesial root, close to the canal entrance (Figure 2B).

In the same session, the filling material was removed (Figure 3A) with Protaper Retreatment files in the distal canal (Denstply, Rio de Janeiro, Brazil) and Hedstroen manual files (Denstply, Rio de Janeiro, Brazil) in the mesial canal, due to suspected fracture of the file in the apical third. The fractured file was confirmed (Figure 3B) with an x-ray. Calcium hydroxide intracanal medication was placed (Biodinâmica, Ibiporã, Brazil) associated with serum (20-day interval) followed by

an IRM (Denstply, Rio de Janeiro, Brazil) temporary restoration.

In the following session, the patient returned with reduced symptomatology, and it was decided to replace the intracanal medication one more time. With an interval of 15 days, the patient returned without complaints of pain. After removing the medication with 2.5% sodium hypochlorite, the gutta-percha cone was tested and kept inside the canal as a form of protection to seal the perforation (Figure 4) with MTA-based repair cement (MTA HP Repair, Angelus Industria de Produtos Odontológicos S/A, Brazil).

The MTA cement was manipulated, dispensing the first drop of liquid (distilled water), in the proportion of 3 drops of liquid to a portion of powder, reaching a homogeneous consistency (Figure 5). The cement was inserted with a small MTA applicator (Angelus Industria de Produtos Odontológicos S/A, Brazil) (Figure 6), and adapted with an insertion spatula. After verifying the adaptation of the repair cement (Figure 7A), the canals were filled with an MTA based endodontic sealer (MTA Fillapex, Angelus Industria de Produtos Odontológicos S/A, Brazil) and gutta-percha cones, using the lateral condensation technique (Figure 7B).

The tooth was provisionally restored. An x-ray was taken (Figure 8A). A post, buildup, and crown restoration were planned for a later session. Twelve months after the completion of treatment, the patient returned for control with no spontaneous pain, and no radiographic changes (Figure 8B).

Conclusion

Suitably endodontic retreatment using proper techniques and materials leads to satisfactory results preventing tooth loss. In the present case, MTA cement and sealer allowed repair of periapical tissues, with no clinical and radiographic changes.

References

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3. Mente J, Hage N, Pfefferle T, Koch M J, Geletneky B, Dreyhaupt J et al.: Treatment outcome of mineral trioxide aggregate: repair of root perforations. J Endod. 2010; 36: 208–213.
4. Mente J, Leo M, Panagidis D, Saure D, Pfefferle T. Treatment outcome of mineral trioxide aggregate: repair of root perforations-long-term results. J Endod. 2014 Jun;40(6):790-796.
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Figure descriptions

Figure 1: Initial x-ray.

Figure 2: A. After removing restorative material. B. X-ray to confirm the presence of root canal perforation.

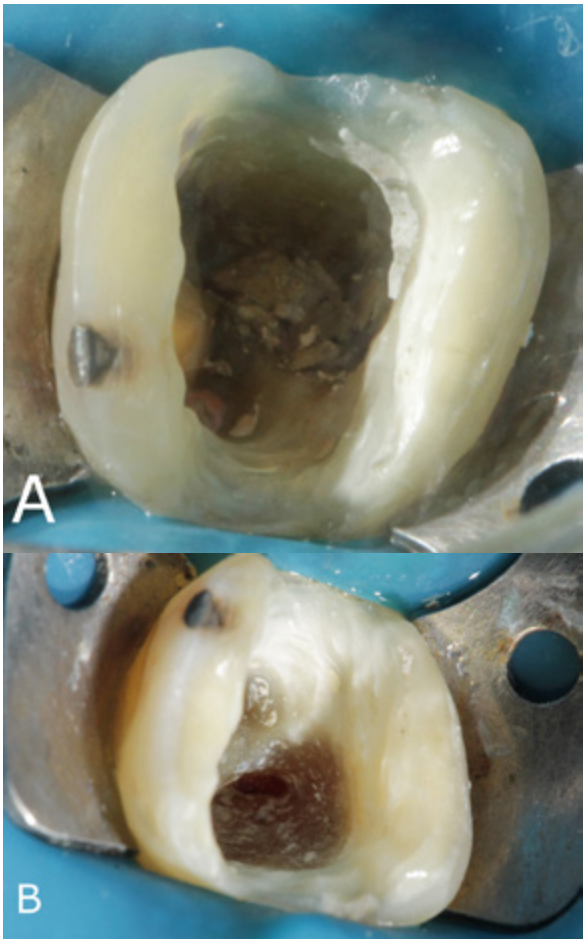

Figure 3: A. Removal of filling material B. X-ray to confirm the presence of a separated file.

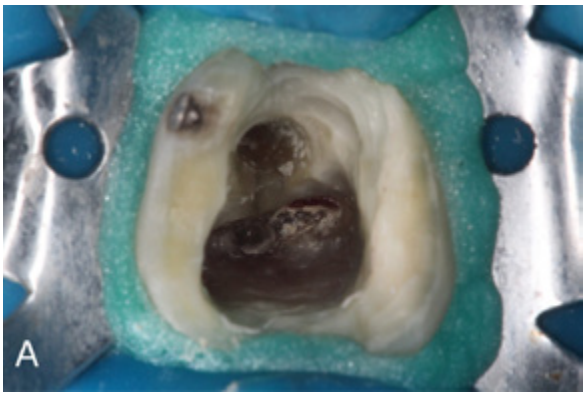

Figure 4: Gutta-percha cones protecting the entrance of the root canals

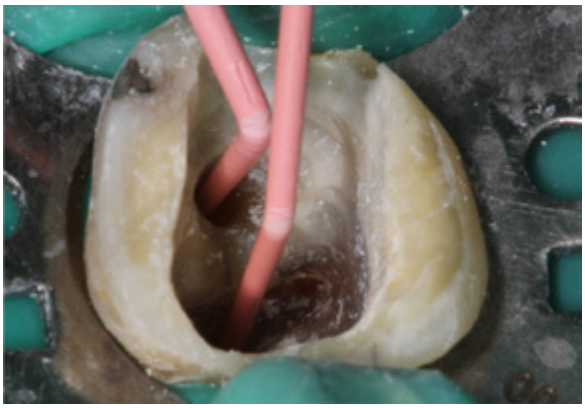

Figure 5: MTA HP Repair manipulation A. Powder B. Liquid C. Mixed repair cement

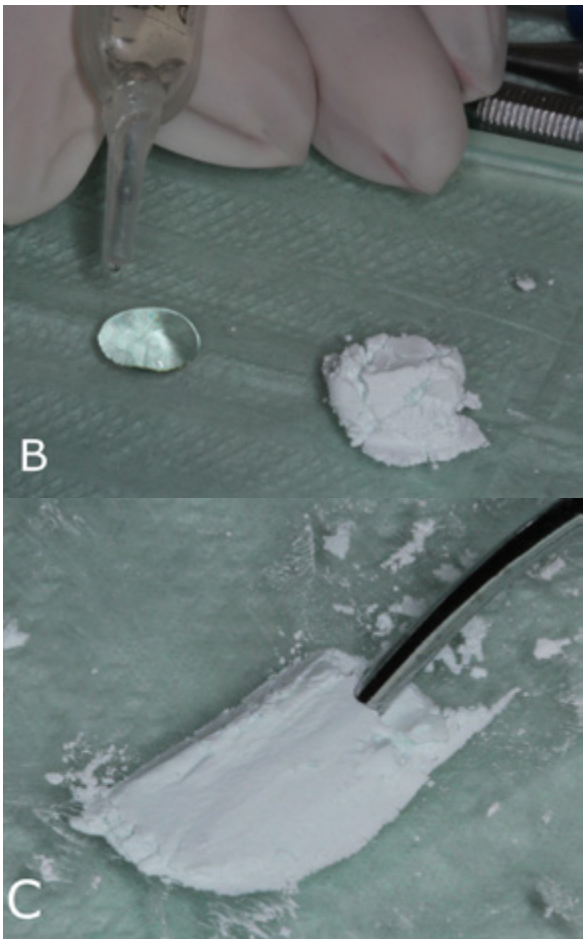

Figure 6: Insertion of cement in the root canal perforation.

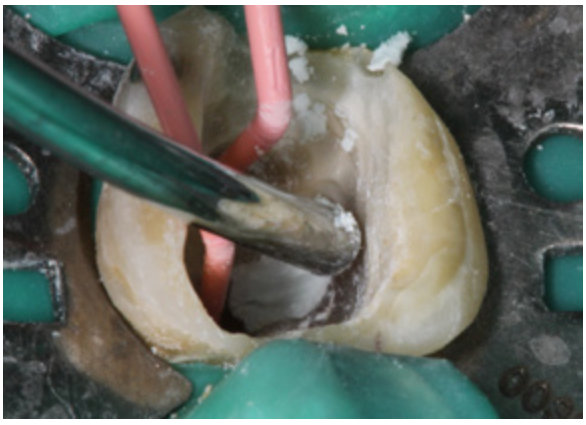

Figure 7: Clinical aspect after sealing the perforation (A) and filling the canals (B).

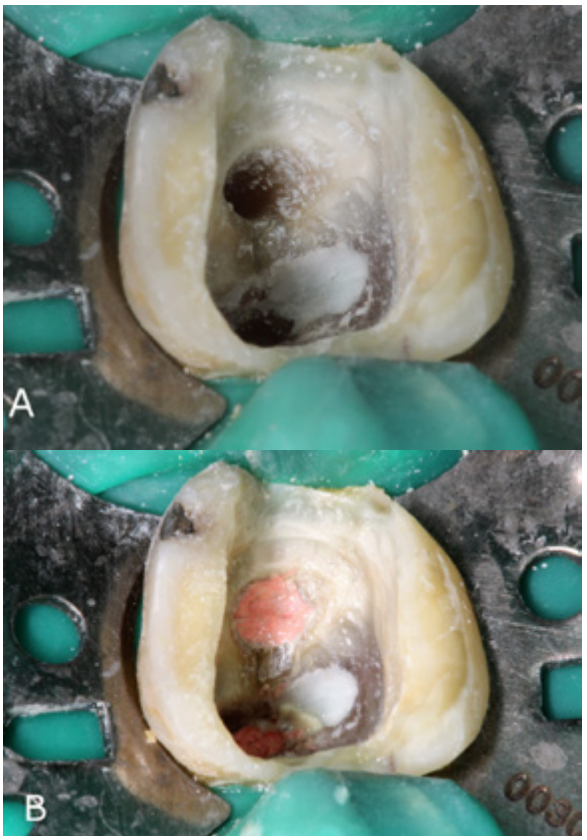

Figure 8: A. Final radiography B. Follow-up after Twelve months.