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Furcal perforation repair using premixed MTA: A case report

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Abstract

Furcal perforations have a guarded prognosis and a difficult resolution. While several materials have been proposed, cements based on calcium silicate, particularly mineral trioxide aggregate (MTA), have received the highest recommendations. Premixed MTA is used in this case report of nonsurgical endodontic treatment of furcal perforation in mandibular first molars. Based on clinical evidence, premixed MTA has shown good clinical behaviour in the resolution of iatrogenic furcal perforations.

Keywords: Furcal perforation, iatrogenic errors, Non-surgical root canal treatment, premixed mineral trioxide aggregate.

Introduction

A furcal perforation is a pathological or iatrogenic opening between the alveolar bone and the pulp chamber floor. According to Ingle, perforations accounting for roughly 9.6% of treatment failures are the second most common reason for endodontic failure.[1] Perforation always results in bacterial infection, inflammation, bone resorption, and epithelial tissue proliferation. When searching for a canal opening, direct furcal perforation occurs as a punched-out flaw into a furcation made with a bur, it may be tiny, have walls[2] and is associated with a poorer prognosis compared to other sites. A good result is more likely when the perforation defect is sealed right away using a biocompatible substance that will promote healing.

The tissue compatibility, bioactivity, and sealing qualities of the repair materials have a significant impact on the perforation sealing. Currently, the most popular material for treating this problem is mineral trioxide aggregate (MTA).

Premixed MTA (PMTA), or MTA putty, has been introduced recently. It can be injected directly from the syringe to the desired location because of its flow ability.

These are made up of a non aqueous liquid that is water soluble and cement granules containing calcium phosphate along with several additives, including calcium chloride or zirconium oxide as an accelerator and methylcellulose or glycerin as an anti-washout component. Because of this, they are more cohesive and plastic, which speeds up the setting process and reduces the possibility of inhomogeneous mixing.[3] Premixed type and standard MTAs have been evaluated by some authors. According to the results, premixed-type MTAs are more capable of releasing calcium and have a higher pH than standard MTAs. PMTA have been preferred to regular MTA in terms of their usability, handling properties, sealing ability[4], marginal adaptation[5], regenerative properties, inductive properties, and tissue compatibility.[6] Nonetheless, the antibacterial qualities, clinical performance and cytotoxic dangers of premixed type and conventional materials are comparable.[7]

Thus, the purpose of this case study is to demonstrate how PMTA can be used successfully to treat iatrogenic furcal perforation.

Case report

A 27-year-old male was referred by a private dentist for potential endodontic treatment with tooth 46. Clinical examination revealed that the tooth was sensitive to percussion and that there was some buccal soreness. The average depth of the probing pocket was within normal limits.

Periapical, furcal radiolucency indicative of perforation and instrument separation in mesial root were seen on the preoperative radiograph. Local anaesthesia using 2% lignocaine hydrochloride solution with 1:80000 adrenaline was administered. The tooth was then isolated using a rubber dam. The extent of the perforation was seen by removing the coronal temporary restoration. A magnifying loupe was utilized to examine the pulp chamber, and a sharp DG 16 explorer was used to locate the canal orifice.The canal patency was established using a number 10 K file (Dentsply, Maillefer). A periapical radiograph was used to confirm the working lengths, which were ascertained using an Root ZX II apex locator (Jmorita). The separated instrument in the mesiolingual canal was bypassed using a number 8 and 10 K-file. Later all of the canals were cleaned and shaped using ProTaper Universal Rotary File Systems along with copious irrigation using 5.25% sodium hypochlorite and 17% EDTA. To maintain canal patency, gutta-percha cones were used to seal the canal orifices, perforation repair were done with PMTA (safeendo, biostructure) condensed into place using condensers and finally covered with cotton pellet and temporary cement. In the follow-up visit next day, the patient showed no symptoms. and hence obturation was carried outusing AH Plus sealer and gutta-percha points. During this visit, composite was also used to place a permanent restoration. The followup was scheduled after 1 week and then after 1 month during which patient was asymptomatic. Three months following therapy, there is evidence of healing as bone growth is seen Radiographically next to the MTA on radiographs.

Discussion

An undesirable issue that can arise during RCT or after preparation is perforation. While treating a patient with caries in pulp chamber, there may be a risk of perforation during the removal of damaged tissue. Efficient and prompt resolution of this untoward crisis is necessary to guarantee a favourable outcome.[8] In the case mentioned above, the issue was quickly resolved by the use of premixed MTA, thus reducing the time required to mix and fill the regular MTA. Abdelmotelb et al. (2021) reported better mineralization potential[9], sealing properties & performance for premixed BC than

regular MTA.[10] PMTA similar to the other premixed bio ceramics are clinically and Radiographically superior to that of MTA. Hence PMTA was preferred for this case.

Conclusion

Although premixed MTA use has been documented, there is little research on its effectiveness. Even though smaller lesions have a better prognosis, MTA shows promise as a material for furcal perforation repair. PMTA needs more testing, though, to see how it reacts to occlusal forces.

Legend Figures

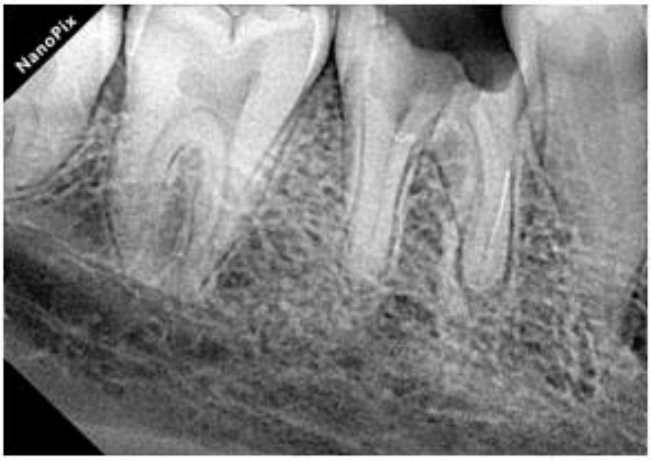

Figure 1: Preoperative radiograph

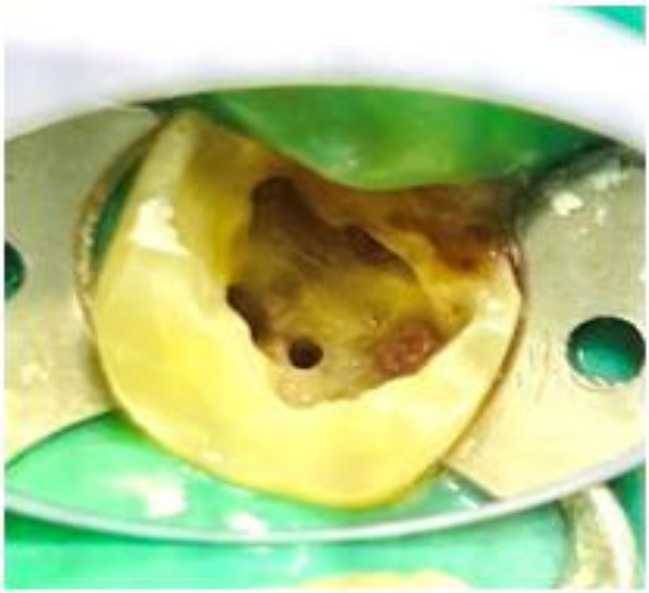

Figure 2: Preoperative clinical photograph

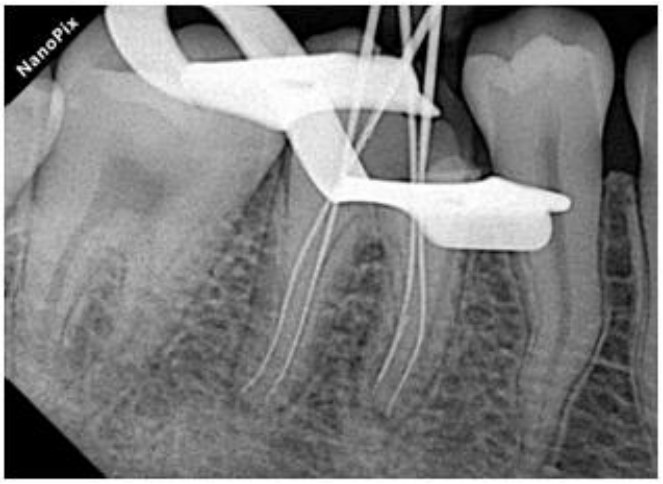

Figure 3: Working length radiograph

Figure 4: Master cone selection radiograph

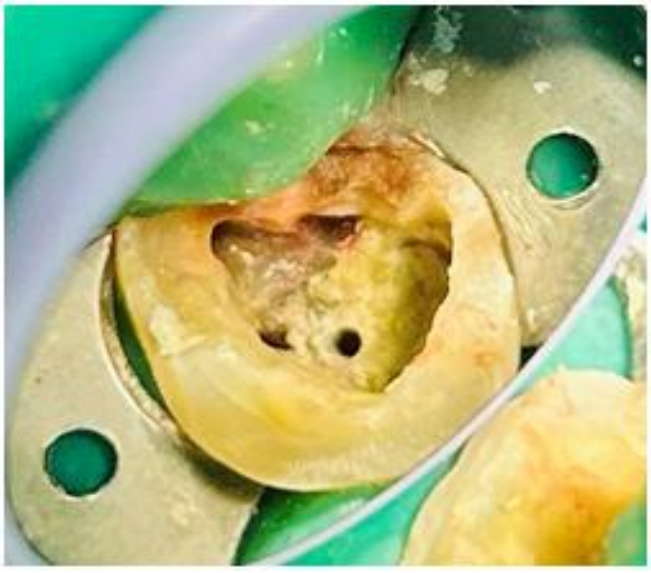

Figure 5: Clinical photograph of perforation repair

Figure 6: Postoperative radiograph

Figure 7: 3 Month follow up radiograph

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