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Repair of Root Perforations Using Mineral Trioxide Aggregate – A Case Series

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Abstract: *Introduction: Canal perforation is an undesired complication that can occur during endodontic procedures. Earlier inadequacy of repair materials had contributed to the poor outcome of repair procedures. This case report includes cases of perforation repair with Mineral Trioxide Aggregate (MTA), which has recently shown successful outcome. Method: The perforations were cleaned with sodium hypochlorite and saline and sealed with MTA without internal matrix. Result: After 1 year, the absence of periradicular lesions, pain, and swelling along with functional tooth stability indicated the successful use of MTA for repair. Conclusion: MTA has shown great potential as a material for repair of perforations.*
Keywords: *furcation, management, mishaps, transportation*

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I. Introduction

As Denis Waitley said "Mistakes are painful when they happen, but years later a collection of mistakes is what is called experience." In the field of dentistry as well, an operator may encounter unforeseen circumstances during a root canal therapy. One such procedural accident is root perforation which is an artificial communication between the root canal system and the oral cavity or the supporting structures of the tooth. The causes of perforation are usually iatrogenic i.e. accidental perforation either during access cavity preparation and search of canal orifices or during post space preparation. The non-iatrogenic causes like root resorption and dental caries may also lead to perforation.

The repair of such perforations pose a great challenge to the endodontic practitioner. The prognosis of such teeth depend mainly upon three factors i.e location and site of the perforation, size of the perforation and, time elapsed between its occurrence and treatment. The location of a perforation is the most important factor affecting the treatment prognosis.[1] When perforation site is present at the level of crestal bone and epithelial attachment, there are chances of apical migration of epithelium into the perforation site.[2,3] This may further lead to formation of periodontal pocket. On the other hand, when the perforation site is close to the gingival sulcus, there are high chances of contamination by bacteria from the oral cavity through the sulcus. With respect to the size of the perforation, a small perforation is easier to seal, also, the chances of extrusion of the repair material into the surrounding tissues are less.

The successful treatment of root perforation requires materials which are biocompatible, and those which can set in the presence of moisture and blood. The materials that have been tried for the repair of perforations are: silver amalgam, super Ethoxy Benzoic Acid, Cavit, calcium hydroxide, gutta percha, calcium phosphate cements and composites. The main disadvantage of these materials is the lack of adequate biocompatibility. With the advent of materials like Mineral Trioxide Aggregate (MTA), this problem has been solved. Numerous studies in the literature have documented the biocompatibility of MTA.[4,5,6,7] In addition, the setting of MTA is not affected by the presence of body fluids such as blood.

II. Case Reports

CASE - 1

A 30 year old male patient came to the Department with the complaint of pain from few days in the lower left back tooth. He had undergone root canal treatment of his lower left molar about 1 year ago. Upon clinical examination, patient had pain on percussion with respect to 36.On radiographic examination, a perforation in the mesiobuccal root was observed which led to radiolucency in the furcation area (Figure 1). Retreatment was initiated, metal posts were removed from the mesiobuccal as well as the distal canals, and the previous obturation material was also removed. Hemorrhage was controlled with copious irrigation with 1% sodium hypochlorite and saline. The working lengths were determined using Root ZX mini Apex locator (J.

Morita Corporation) The perforation site was identified. The canals were cleaned and shaped using Hyflex CM rotary files (Coltene Endo) in a crown-down technique and copious irrigation with 3% sodium hypochlorite was done. Root canals were obturated and perforation was sealed with MTA-sterile saline paste (MTA Angelus, Angelus Industria). The paste was carried to the perforation site using an amalgam carrier and condensed well with the help of hand and finger pluggers. A moist cotton pellet was then placed in the pulp chamber to provide a humid environment for the MTA to set and the tooth was temporary filled with Cavit (Cavit-G, 3M ESPE). In the next appointment, the cotton pellet was removed and the hardness of the set MTA was gently tested with an operative explorer. Final restoration of the access cavity was done with composite (3M ESPE).

At 3-month follow-up, the patient was asymptomatic and radiographic examination revealed healing of the lesion (Figure 5). A second follow-up at 6 months revealed an absence of clinical symptoms and adequate clinical function. Radiographic examination showed that the furcal radiolucency had disappeared (Figure 6). Post-endodontic restoration of the tooth in the form of a crown was planned.

Figure 1. Perforation in the mesiobuccal root was observed which led to radiolucency in the furcation area

Figure 2. 3-month follow-up

Figure3. 6months follow up

CASE - 3

A 27 year old female patient was referred from the Department of Prosthodontics with a long standing sinus opening with respect to 22. Patient gave a history of trauma 10 years back. Root canal treatment with respect to upper right front tooth was done 1 year back followed by crown placement. On clinical examination, a sinus opening with respect to 22 was noticed. Radiographic examination revealed obturated 22 with radiopaque filling material in the coronal portion approaching the lateral aspect of the tooth (Figure 4). The filling material was removed from the coronal portion and a perforation site was detected on the distal aspect. The perforation was confirmed by negotiating the site with a K file (Figure 5). Copious irrigation with 1% sodium hypochlorite and saline was done following which it was sealed with MTA using finger pluggers as described in case 1(Figure 6).

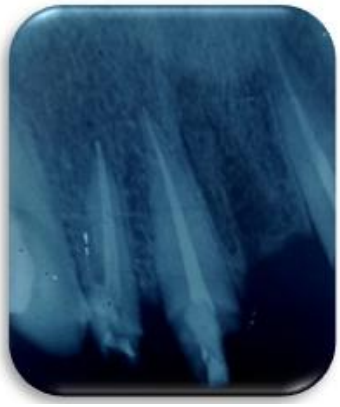

Figure 4. Radiopaque filling material in the coronal portion approaching the lateral aspect of the tooth

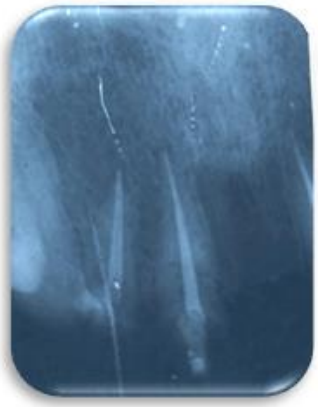

Figure 5. perforation was confirmed by negotiating the site with a K file

Figure 6. Perforation sealed with MTA

III. Discussion

In recent times, evidence-based medicine stresses over the importance of clinical data for evaluating clinical outcomes when new materials are being used in humans. For such cases, neither in-vitro nor in-vivo animal tests are adequate. In 2004, Main *et al.* suggested the need for a clinical study to prove the efficacy of MTA as a perforation repair material.[8] The present report describes the treatment of 2 cases of root perforations using an orthograde approach which included sealing of the defect with MTA without any internal matrix. In both the cases, healing was evident. MTA was used in these cases on the basis of our knowledge about the property of the material and it indeed resulted in successful repair of the perforations. After a year, the teeth remained asymptomatic and radiographic examination showed signs of normality. Holland *et al.* speculated on the importance of the debris in the defect, which could obstruct the close contact between MTA and the periodontal tissue and hence its affect on the subsequent healing process.[9] In order to reduce the amount of debris in all the cases, irrigation with 1% sodium hypochlorite and saline was done before sealing the perforation.

IV. Conclusion

MTA as a perforation repair material has shown successful results in providing good clinical outcome. The only concern is its inability to withstand occlusal forces due to its low compressive strength which needs to be further evaluated.

References

[1]. Fuss Z, Trope M. Root perforations: classification and treatment choices based on prognostic factors. Endod Dent Traumatol. 1996 Dec;12(6):255–64.

[2]. Beavers RA, Bergenholtz G, Cox CF. Periodontal wound healing following intentional root perforations in permaent teeth of Macaca mulatta. International Endodontic Journal. 1986 Jan;19(1):36-44.

[3]. Hartwell GR, England MC. Healing of furcation perforations in primate teeth after repair with decalcified freeze-dried bone: a longitudinal study. Journal of endodontics. 1993 Aug 1;19(7):357-61.
[4]. Perdigão J, editor. Restoration of Root Canal-Treated Teeth: An Adhesive Dentistry Perspective. Springer; 2015 Oct 2.
[5]. Koh ET, McDonald F, Ford TR, Torabinejad M. Cellular response to mineral trioxide aggregate. Journal of Endodontics. 1998 Aug 1;24(8):543-7.
[6]. Pistorius A, Willershausen B, Marroquin BB. Effect of apical root-end filling materials on gingival fibroblasts. International endodontic journal. 2003 Sep;36(9):610-5.
[7]. Yoshimine Y, Ono M, Akamine A. In vitro comparison of the biocompatibility of mineral trioxide aggregate, 4META/MMA-TBB resin, and Intermediate Restorative Material as root-end–filling materials. Journal of endodontics. 2007 Sep 1;33(9):1066-9.
[8]. 8) Main C, Mirzayan N, Shabahang S, Torabinejad M. Repair of root perforations using mineral trioxide aggregate: a long-term study. Journal of Endodontics. 2004 Feb 1;30(2):80-3.
[9]. Holland R, Mazuqueli L, de Souza V, Murata SS, Júnior ED, Suzuki P. Influence of the type of vehicle and limit of obturation on apical and periapical tissue response in dogs' teeth after root canal filling with mineral trioxide aggregate. Journal of Endodontics. 2007 Jun 1;33(6):693-7.

Conflict of Interest: None.

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