Perforation repair using Mineral Trioxide Aggregate as reparative material: A Case Report

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Abstract:
Furcation perforation is an iatrogenic perforation in furcation area in multi-rooted molars during access cavity preparation. Iatrogenic perforations occur as a result of inappropriate use of endodontic instruments, atypical tooth position in the arch. lack of knowledge in dental anatomy, calcified pulp chamber, endodontic procedure through prosthetic crowns. The successful perforation management include, level and location, size, repair time, access and visibility of the perforation, periodontal status of the tooth and biocompatibility of perforation repair material
Keywords: perforation, root canal anatomy, MTA, root canal treatment.

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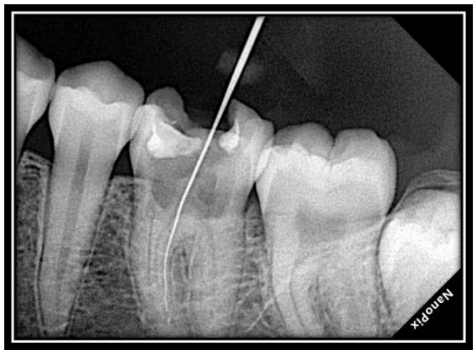
INTRODUCTION

Artificial communications between the tooth and supporting tissues that develop pathologically or iatrogenically are called perforations. The root canal therapy's long-term prognosis may be significantly impacted by these perforations. Pathological communication is generated by resorption and caries, whereas iatrogenic communication is formed after root canal therapy.[1] the primary consequence of a perforation is the loss of teeth and subsequent inflammation of the periodontal tissues. Postponing the repair of the perforation may result in a poor outcome. The many types of perforations are categorized according to their location: coronal, furcation, post space, and root canal. Furcation perforation is an iatrogenic perforation that occurs during the preparation of the access cavity in multirooted molars. Atypical tooth positioning inside the arch and improper use of endodontic instruments can lead to iatrogenic perforations. ignorance of endodontic treatment using prosthetic crowns, calcified pulp chambers, and tooth anatomy.[2] .A few factors that contribute to effective perforation management are the perforation's size, location, and level as well as its accessibility and visibility, the tooth's periodontal health, and the biocompatibility of the material used to repair it.[3]. A clear diagnosis of a perforation based on radiographic findings and symptoms can increase the likelihood that a perforation repair operation will be successful.

CASE PRESENTATION

A 45-year-old male patient arrived at the conservative dentistry and endodontics department complaining of pain in his lower right rear area of his jaw that had persisted for the previous eight days. After reviewing the principal complaint's history, it was determined that tooth #46's pulpal therapy had begun ten days prior. Fever, pus discharge, or edema had not previously occurred. Medical history did not matter. "Previously initiated pulp therapy with

symptomatic apical periodontitis" is the diagnosis for this tooth. The patient gave their informed permission for this case to be published. The extraoral examination revealed no noteworthy results. A periapical picture was included in the radiography examination. The radiograph showed furcal perforation.

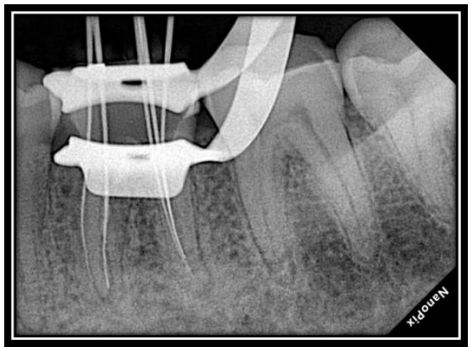


Pre-operative Radiograph

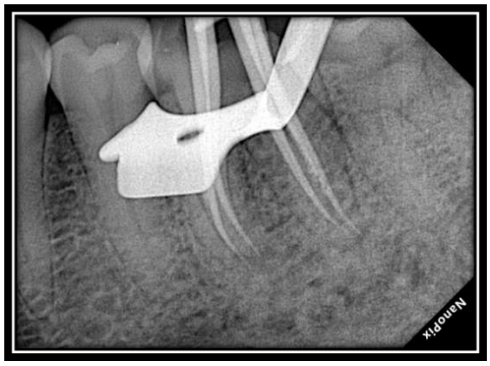
Furcation perforation was confirmed with the help of a radiograph the treatment plan of the case was to continue and complete the root canal treatment of #46 along with perforation repair with a predicted fair prognosis. Bleeding was arrested with the help of a cotton pellet.

Clinical Photograph with Site of Perforation

Following the provision of local anesthetic, treatment commenced. 46 root canals were thoroughly traversed, and the length of the working canal was established. The Crown down procedure was used for cleaning and shaping, while regular saline and diluted 3 percent sodium hypochlorite were used for irrigation. Extrusion of sodium hypochlorite into the periodontal tissues was avoided with great care. Protaper Gold F1 was used for the mesiobuccal ,mesiolingual, distolingual, distobuccal, and middistal canals.



Working Length Determination



Master Cone Selection

Postobturation and Perforation Repair

A single cone method was used to obturate the canals. The material chosen for perforation repair was mineral trioxide aggregate. On a glass slab, mineral trioxide aggregate was worked with. MTA material was carried at the perforation site with the help of an MTA carrier. Above the furcation perforation, MTA was positioned. A cotton pellet was used to damped and condense MTA. Over it was a glass ionomer repair. The patient was prescribed antibiotics and analgesics. Following the surgery, the patient's pain decreased, and the following day, they showed no symptoms. Patient was recalled after 30 days for follow up.

Postoperative Follow-up Radiograph

DISCUSSION

Perforation acts as an open channel for bacteria to enter, either from the root canal or periodontal tissues, or both, eliciting an inflammatory response that can lead to fistulae and bone resorptive processes.[4] when a perforation occurs laterally or in the furcation area, gingival epithelium may overgrow towards the perforation site, worsening the tooth's prognosis. Depending on the size and location of the perforation, repair can be accomplished using either a conservative, non-surgical technique or surgical intervention. All perforations must be sealed to prevent the entry of noxious elements from within the tooth that will cause complications.5 A more number of perforation repair materials are available in the market , that include Indium foil, Amalgam , Plaster of Paris, Zinc Oxide Eugenol, Cavit Glass Ionomer Cement, Composite, Super EBA, IRM, Gutta Percha, Dentin chips, Decalcified Freezed Dried Bone, Calcium Phosphate Cement, Tricalcium Phosphate Cement, Hydroxyapatite, Calcium hydroxide Portland Cement, Mineral Trioxide Aggregate, Biodentine, Bioaggregate Endosequence, etc. Many of these materials are not used now because their disadvantages outweigh their benefits. Mineral Trioxide aggregate showed good treatment outcomes owing to its biocompatibility and low tissue toxicity. MTA can provide an adequate seal in the presence of moisture and blood which is the most significant advantage when it is used as a furcation repair material. MTA has an alkaline pH of 12.5 and aids in periodontal ligament regeneration and cementogenesis.6 this case of furcation perforation was managed with MTA. Since there was contact with the periodontium and contamination from blood and moisture, a material was to be selected which was set in the presence of moisture. 7 relating all of these properties, MTA is the most commonly used perforation repair material.

CONCLUSION

A perforation is an unfortunate mishap during treatment that can happen to the best of us. Regardless of the approach, surgical or non-surgical; there are certain factors that can significantly affect the success of repair. The clinician should have thorough knowledge about tooth anatomy, sound clinical judgement and adequate operative skills so as to avoid a perforation.

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