Repair of Furcal Perforation in Mandibular Molar Tooth Using Light - Cured Glass Ionomer Cement : A Case Report

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Abstract

Perforation repair is a fairly common endodontic procedure. The purpose of this case report was to present a clinical case of perforation repair of mandibular first molar. A case was selected based on clinical and radiographic examination. The cases was retreated, repaired with light cure glass ionomer cement, and restored. Recalls were carried out after six months. Perforation repair was shown to be successful in this case. Light cure glass ionomer cement can be used as successful alternative to MTA for perforation repair in mandibular molar.

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Introduction

Perforations are unfortunate complications that occur in the course of endodontic treatment even by the most skilled clinicians. Perforations may be caused by iatrogenic dentistry, resorptive processes, or caries and can be diagnosed through direct observation of bleeding, indirect bleeding assessment by means of a paper point, radiographs, and an apex locator. Perforation defects may be repaired by non-surgical or surgical techniques. How they are managed can make the difference between retention and the loss of a tooth. Fuss and Trope developed a classification of perforations as a predictor of prognosis. They described perforations that are small, within bone, and repaired immediately as having the best prognosis.

The ideal material for treating endodontic perforations should be non-toxic, non-absorbable, radiopaque, bacteriostatic or bactericidal and easy to apply. The material should also provide a tight seal against microleakage at the perforation site. Various materials have been utilized for perforation repairs, such as zinc oxide and eugenol- based cements (IRM and EBA),mineral trioxide aggregate (MTA),amalgam, glass ionomers, guttapercha, calcium hydroxide and calcium hydroxide or Kl orapercha N-O-covered with amalgam or guttapercha, hydroxyapatite and plaster of Paris.

Mineral trioxide aggregate (MTA) is widely accepted as the preferred repair material for root perforations within bone. However, one of the limitations of MTA is its extended setting time and difficulty in handling. The material is more suitable for box-like cavities where it can be lightly packed.

Various other materials can be used to save a perforated tooth. The material of choice must exhibit basic properties such as bio-compatibility, ability to adhere to tooth structure for adequate sealing and ease of application.

In this case report, a perforation repair was carried out in which a light-cured glass ionomer was used.Post-operative evaluations were conducted at three and six month interval.

Case Report

A 27-year-old female was referred for the treatment of pain and swelling associated with her mandibular left first molar. The tooth had a history of intermittent pain.

Her previous medical history was unremarkable. Extra-oral examination revealed no abnormalities.

Intraoral examination revealed that the tooth was tender to vertical percussion and apical palpation and had class I mobility. A sinus opening was seen in the attached gingiva between the tooth and second molar

Radiographic findings showed poor endodontic treatment without obturation of the canals, a periapical radiolucency, widening of the periodontal ligament. A diagnosis of a failed root canal treatment and chronic periapical periodontitis with possible mesial perforation was made. Endodontic re-treatment with possible perforation repair by using light-cured glass ionomer (GC Fuji Lining LC, GC, Japan) was suggested to the patient. At the next treatment visit, the tooth was isolated with rubber dam. After removal of the existing restoration, a mesial – lingual perforation was observed at the base of the pulp chamber. Bleeding was arrested by rinsing with 1% sodium hypochlorite and pressure packing with gauze. The next step was the removal of debris and remaining caries from the perforation site. The perforation defect was then repaired using a light-cured glass ionomer, GC Fuji Lining LC (GC, Japan) following the manufacturer's instructions. The material was mixed to a slightly running consistency for ease of application and was carried into place by using a periodontal probe. The perforation site was gradually filled up from the base with the material covering about 2-3mm of the surrounding dentin, and then light-cured. Final thickness of the material was about 2mm. Care was taken not to occlude the orifices of the canals. Subsequently, conventional endodontic re-treatment procedures were carried out followed by obturation.

At three months review, the patient reported no signs and symptoms. There was no tenderness to percussion and palpation; the draining sinus had healed. Inspection of the perforation site was performed by removing the temporary restoration under rubber dam. It was noted that the repaired site was intact (visual and tactile examination) and clinically there were no signs of leakage.

Six months after the first visit, the tooth remained asymptomatic. Regular recall were done at six-month interval.

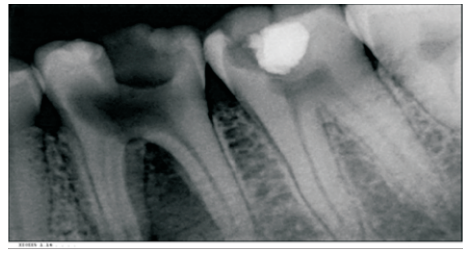

Fig -1 Pre-Operative Radiograph

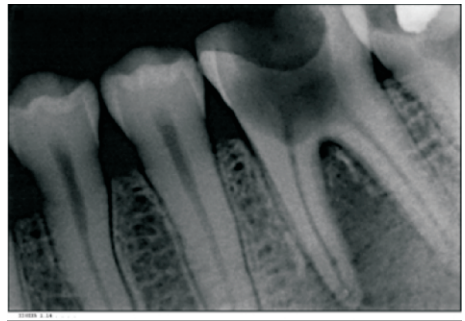

Fig 2 -3 Perforation Repair Using Light Cure G.I.C

Fig 4- Post -Obturation

Discussion

Maintaining the integrity of the natural dentition is essential for function and esthetics. Endodontic therapy can play a vital role in achieving this goal. Occasionally technical problems do occur during endodontic treatment i.e. perforating a wall or floor of the pulp chamber or root canal during caries removal, during access cavity preparation, locating of canals and mechanical debridement. This can significantly impair the long-term prognosis of a tooth. Different materials have been used for endodontic perforation repair and the search for an ideal perforation repair material is a challenge. A repair material has to be placed in intimate contact with hard tissues of the tooth and soft tissues of the periodontium. These materials may pose a threat to endodontic treatment outcome by causing local orsystemic adverse effects, either through direct contactwith or leaching of chemical components into the periodontal tissues and alveolar bone.In this case report, a light-cured glass ionomer was chosen as an alternative to MTA. Light-cured glass ionomer is a small particle, hydrophilic, non-aqueous resin combined with a photo initiator and glass powder formulation. The advantages of this material are its insolubility in oral fluids, reasonable adhesion to tooth structure, high strength, and dual cure properties. Light cured glass ionomers also offer the following attributes: low cure shrinkage, low thermal expansion and extended fluoride release as found in traditional glass ionomers. Traditional clinical applications for light-cured glass ionomer include: erosive lesions in geriatric patients, fixed prosthetics and resin bonded retainer cementation, porcelain repair, bonded amalgam restorations, core material, and pediatric restorations. The formation of an epithelial and connective tissue adherence to light-cured glass ionomer represents a significant advancement in the ability to restore previously considered hopeless teeth. The clinical and histological investigation of light-cured glass ionomer demonstrates a biocompatibility to both soft and hard tissues. As an additional benefit, fluoride release from light-cured glass ionomer may positively affect bacterial plaque biochemistry through an alteration of carbohydrate metabolism. As the material polymerizes with visible light, its setting is fast and controllable, thus improving performance and reducing messy handling.

This is in contrast to MTA, which has an extended setting time and requires careful handling. Based on the above, even an inexperienced operator will appreciate the handling of a light-cured glass ionomer as being less demanding. In addition, sealing and resistance to microleakage are predictable as the material through chelation, chemically bonds to both enamel and dentin, while the material has been proven to be biocompatible. Glass ionomer, as a restorative dental material, has been successfully utilized for treatments of tooth abfractions, external root resorption, and root perforation repair. Economically the glass ionomer material has a significant advantage over MTA and it should, therefore, be of interest to many practitioners. However, more evidence from randomized controlled clinical trials needs to be generated to assess whether a more conclusive valid recommendation can be made about the performance of light-cured glass ionomers for the repair of endodontic perforations.

Conclusion

The quality of the restorative treatment is likely to have a big impact on the long-term success or failure of treatment. The light cured glass ionomer cement is a good alternative for perforation repair.

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