



Furcal Perforation Repair With Biodentine – A Case Report

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Abstract

Abstract: One of the most common reasons for the failure of endodontic treatment is root perforation. Perforations might occur due to carious lesions, tooth resorption or they might be iatrogenic during endodontic treatment or during post space preparation. In the past, inadequacy of the repair materials has been a contributing factor to the poor outcome of repair procedures. Now with the advent of many biocompatible materials, it is possible to close the communication between the pulp chamber and the underlying periodontal tissues.

Keywords: Furcation, Perforation, Biodentine

Introduction

Furcal perforation is often an iatrogenic error that occurs during access opening due to misalignment of bur or even while searching for canal orifices in the floor of the pulp chamber.

Failure to detect and treat a perforation may cause a chronic inflammatory reaction of the periodontal apparatus which can lead to irreversible loss of the periodontal attachment, bone resorption and, eventually, tooth loss.

A large number of factors influence the prognosis of perforated teeth, including the duration of the presence of perforation, size of perforation and its location with respect to the crest of the alveolar bone, presence of a periapical lesion and the time interval between the occurrence of perforation and the repair procedure.

Clinically, a furcal perforation can be determined by the presence of profuse bleeding. Radiographically, a furcal perforation can be seen as a radiolucency in the

floor of the pulp chamber that forms a communication between the pulp space and the periodontal attachment.

A variety of materials have been used in repairing perforations including zinc oxide eugenol, amalgam, calcium hydroxide, composite resin, glass ionomer, resin-modified glass ionomer and Mineral Trioxide Aggregate (MTA)^[1]. Biodentine is a calcium silicate based restorative cement with few dentin-like properties, which can be used as a dentin substitute. Advantages of Biodentine over MTA are short setting time, better mechanical properties, ease of handling and potential color stability. As the setting is faster, there is a lower risk of bacterial contamination than with MTA^[2]. The aim of this case report is to present a successful treatment of furcal perforation by Biodentine.

Case Report

A 26-year-old male patient came to the Department of Conservative Dentistry and Endodontics with a

chief complaint of continuous dull pain in lower right back tooth region since 15 days. The tooth was slightly tender on percussion and showed no mobility. The patient gave a history of root canal treatment 1 month prior which he had discontinued halfway. Clinical examination revealed incomplete access cavity and a perforation on the floor of the chamber w.r.t. 46. Radiographic examination revealed a radiolucency in the floor of the chamber including furcation area along with periapical radiolucencies.

Patient was informed about the situation and it was decided to attempt repair of the perforation followed by root canal treatment. The access cavity was refined and working lengths were determined using a no.10 and 15 files. The canals were cleaned and shaped upto F2 (protaper gold) with copious saline irrigation.

Once cleaning and shaping was completed, the canals were then blocked with files to prevent the entry of the reparative material.

Biodentine™ was manipulated by mixing five drops of the liquid provided by the manufacturer into the capsule. The mix was carried to the site of perforation. A plugger was used to condense the mix at the site.

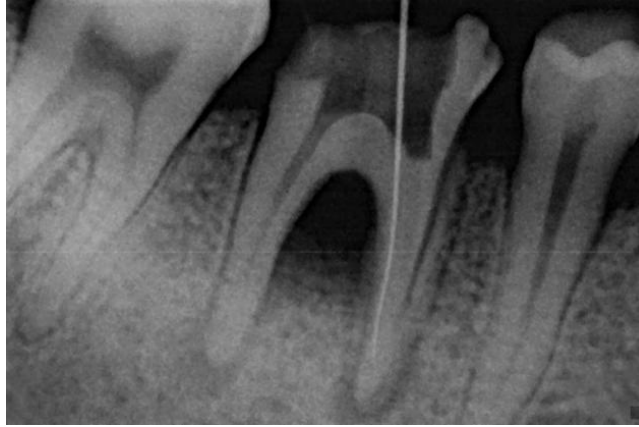
After the Biodentine had set, the files were removed from the canals and calcium hydroxide was placed in the canals. A cotton pellet was placed in the chamber and the access was temporized with zinc oxide eugenol.

The patient was recalled after a week. After careful radiographic examination, the canals were irrigated and obturated. The patient was recalled on three and six months follow up and radiographs were taken which showed that the periapical radiolucencies had reduced considerably along with radiolucency in the furcal area and the tenderness on percussion had subsided completely.

Pre-operative



Placement of biodentine



Obturation



Follow-ups

3 months follow-up



6 months follow-up



Discussion

A perforation can negatively affect the prognosis of root canal therapy unless it is managed effectively and promptly. A study has reported that perforations

are one of the greatest cause of failures accounting for 9.62% of all unsuccessful cases.^[3] Therefore, this communication between the root canal system and the periodontal apparatus should be sealed with a

biocompatible material as soon as possible. Depending upon the status of the crown structure, the bone surrounding the roots and extent and location of the perforation, a clinician has the option of repairing the perforation, performing a hemisection or bicuspidization or extracting the tooth.^[4]

In the current case, the perforation was chronic with minimal bone loss and sufficient coronal structure was present. Hence it was decided to repair the perforation with a biocompatible material.

Biodentine™ is a calcium silicate based reparative material. It has good handling characteristics with a short setting time of twelve minutes. Biodentine™ increases the secretion of TGF-B1 therefore it is also capable of angiogenesis, recruitment of progenitor cells, cell differentiation, and mineralization. It has a high compressive strength of 220 MPa and elastic modulus of 22 GPa, which is very similar to dentin itself.^[5]

Since the furcation area is subjected to masticatory forces, the repair material used will also bear the brunt of the forces during tooth function. It will also bear the mechanical forces of condensation over the perforation repair site.

Therefore, it is necessary that the repair material have sufficient push out strength to counter these forces. Biodentine is biocompatible and has favorable biomineralization properties and sufficient push-out bond strength for use as a perforation repair material in root canals.^[6,7,8]

Moreover, in a study, the pushout strength of MTA contaminated with blood was slightly lesser than uncontaminated MTA. However, the presence of blood had not affected the pushout strength of Biodentine™.^[4]

Conclusion

Treatment of a perforation may often require a multidisciplinary approach in order to form an appropriate treatment plan, and the clinician must decide whether to treat it with a nonsurgical or surgical approach. The prognosis of perforated teeth is better today than it was in the past largely due to use of biocompatible materials. With this approach,

perforations can be more predictably repaired without surgery, thus reducing the need for invasive and more costly procedures.

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