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Research Paper

Management of Pulpal Floor Perforation Using BIODENTINE: A Clinical Report

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ABSTRACT
The purpose of treating furcal perforation is to seal the artificial communication between the endodontic space and the periradicular tissue to prevent alveolar bone resorption and damage to the periodontal ligament. In reference to the case report the management of an iatrogenic perforation of pulpal floor in the maxillary first molar, using Biodentine is described. Unpredictable endodontic root/pulp chamber floor perforations resulting in unacceptable high rate of clinical failure has now been a lesser threat with the advent of new technologies and biocompatible materials. Present case report illustrates the use of Biodentine for the repair of the perforation defect in the maxillary first molar tooth.

KEYWORDS- *Furcal perforation, Biodentin, root perforations*

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I. INTRODUCTION

Root perforation is an artificial communication between root canal system and the supporting tissues of teeth or the oral cavity.[1] Causes of root perforations include iatrogenic causes, root resorption and caries.[2-4] Often, the cause is iatrogenic as a result of misaligned use of rotary burs during endodontic access preparation and search for root canal orifices.[5] Inappropriate post space preparation for permanent restoration of endodontically treated teeth is another common iatrogenic cause of iatrogenic perforation.[5] Bacterial infection emanating either from the root canal or the periodontal tissues, or both, prevents healing and brings about inflammatory sequelae where exposure of the supporting tissues is inflicted.[6] Thus, painful conditions, suppurations resulting in tender teeth, abscesses, and fistulae including bone resorptive processes may follow. The present case report illustrates the successful non- surgical management of an iatrogenic perforation at pulpal floor level of calcified maxillary first molar.

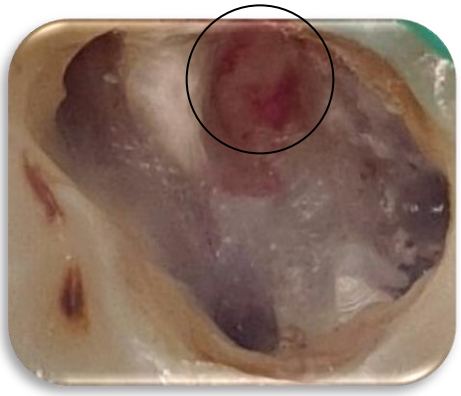
II. CASE REPORT

A 39 year old systemically healthy, female patient reported to the department of Conservative Dentistry and Endodontics with the chief complaint of continuous dull pain in right upper back region of the jaw for more than 4 months. Clinical examination showed occlusal caries in tooth 16. Radiographically calcific canals and pulp stones were seen (Fig-1). To ascertain any canal morphological variation, eccentric radiographs at different angulations were taken.

Fig 1

Endodontic treatment was initiated under rubber-dam isolation. During access opening pulp stone in pulpal chamber was removed. Two calcified canals were negotiated that is mesiobuccal canals and distobuccal canals and an iatrogenic perforation was created during the negotiation of palatal canal (fig-2). During the calcification of the tooth the palatal canal gets shifted to the palatal wall area and so a perforation was created in attempt of negotiating the palatal canal.

Fig 2 Perforation



Microscopic view

Then a GP cone was placed inside the perforation and a radiograph was taken to trace the perforation area (fig 3).

Fig 3

Then the canals were located (fig 4) and prepared upto size F 2 ProTaper files system (Dentsply, Konstanz, Germany) by help of proper irrigation and EDTA. The canals were copiously irrigated using normal saline and 2% chlorhexidine. Sodium hypochlorite was avoided as it could percolate through the perforation into the periodontium. Non-setting calcium hydroxide was used as an intra-canal medicament and the pulp chamber was packed with calcium hydroxide powder and Cavit.

Fig 4

On the subsequent visit after 7 days, the tooth was asymptomatic. The palatal canal was closed by a GP cone so that there will be better visibility for the perforation to be repaired (Fig 5).

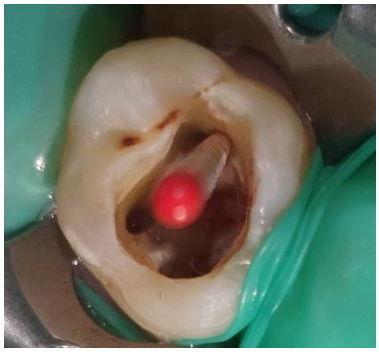


Fig 5

The perforation area was clear and biodentine was used to repair it (Fig 6). The powder biodentine was mixed with saline in a dappen dish and was placed into the perforation area by the help of MTA carrier. The perforation was repaired; using Biodentine to form a complete layer on the floor of the pulp chamber (Fig 7).

Fig 6

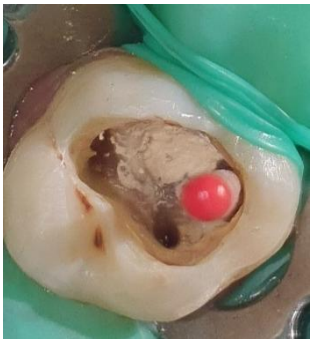


Fig 7

Then master cone F2 was placed in all canal and radiograph was taken (Fig 8).

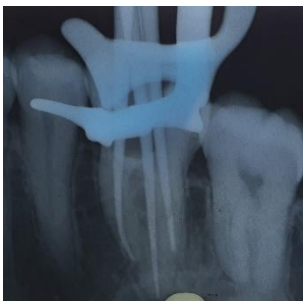


Fig 8

After that mesiobuccal and distobuccal canals were obturated with F2 GP cones and palatal canal was obturated with thermoplastic GP. Then the tooth was completely sealed using Type II glass ionomer cement (Fig 9).

Fig 9

The teeth 16 was subsequently restored with composite resin and a full cast crown was advised for long term success. Written post operative instructions were given to the patient and analgesic (Ibuprofen 400 mg thrice daily) was prescribed for 3 days. Antibiotic (Amoxycillin 500 mg thrice daily) for three days and 0.2% chlorhexidine mouth rinse was instructed for 10 days. Patient was recalled after 4 weeks and was asymptomatic when he last reported.

III. DISCUSSION

Root perforation is an artificial opening occurs in the pulp wall creating communication between the pulp and the exterior. Traumatic (iatrogenic) perforations are due to lack of attention given to details of dental anatomy and failure to consider its variations by the clinician. Furcation perforation usually occurs due to careless access preparation where the bur is not properly angulated with to the long axis of the tooth.[1]

There are several factors that affect the prognosis of endodontically treated tooth with furcation perforation. These factors are time elapsed before filling the defect, size of the perforation, its location and type of the repair material and its ability to seal the perforation. Different materials have been suggested for nonsurgical repair of furcation perforation such as amalgam, calcium hydroxide, gutta percha, Biodentin and MTA (Mineral trioxide aggregate). Extrusion of repair material into the periodontal space can be controlled using bio inert matrices such as indium foil, dentin chips and calcium hydroxide.

Biodentine is a calcium silicate-based bioactive material of powder liquid system. It is calcium silicate based cements in which liquid contains calcium chloride accelerating setting time. The calcium silicate interacts with water leading to the setting and hardening of the cement. Hydration of the tricalcium silicate produces a hydrated calcium silicate gel and calcium hydroxide. It is easy to handle owing to its ease of manipulation and a short setting time approximately 12 minutes, has high alkaline Ph [16]. It has properties such as tissue regeneration and early mineralisation, antibacterial properties, biocompatible, good push out bond strength. Biodentine has elastic modulus of 22.0 Gpa and is similar to that of dentine at 18.5, Compressive strength of about 220 MPa is equal to average for dentine of 290 MPa Microhardness of biodentine at 60 HVN is same as that of natural dentin. Guneser MB et al., reported that biodentine showed considerable performance as a perforation repair material compared to MTA [17].

IV. CONCLUSION

Perforation repair is a frustrating problem to the dentist. So through idea regarding its restorability is essential which includes knowledge of site, size, time of perforation and various materials used. The purpose of this article is to present a case report in which biodentine was used to seal the perforation. Immediate repair with good repair material and trying to be less invasive as possible ensures successful outcome despite complexity of the condition.

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