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Case Study

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MANAGEMENT OF A FURCAL PERFORATION USING BIODENTINE

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ABSTRACT

Perforations in furcation region of molars presents a challenge to the Endodontists interms of the prognosis. This case report presents a furcal perforation in the mandibular molar region and sealing of the perforation using Biodentine. When patient was recalled after 6 months, patient was found asymptomatic and the intra oral periapical radiograph revealed bone formation and healing in the furcal region.

KEYWORDS: Furcal perforation, repair, Biodentin.

INTRODUCTION

Iatrogenic perforations happen in about 2-12% of root canal treated teeth[1] and attributes to nearly 10% of the endodontic failures.[2] Furcal perforation is one such errors that are commonly seen.[3] Deep Carious lesions, post space preparation, iatrogenic errors, anatomical variations of the root canal system are few factors that bring in the difficulties in locating the canals and thus leading to perforation. Studies revealed that accidental iatrogenic perforation contributed to 29% of all the endodontic mishaps and of which 87% of the perforations were seen in the pulp chamber of the molars.[2]

The prognosis of the furcal perforation varies in the multirooted teeth as compared to single rooted teeth.[4] In furcal perforation, there exists a communication between the periradicular tissues and the root canal system.[2] Due to the complexities in tha anatomy and the treatment difficulties, furcal perforations will often lead to furcal bone loss and thus providing a poor/ questionable prognosis. Delay in treatment, size and location of the perforation are the important factors that decide the prognosis.[2]

Depending on the prognosis, either sealing of the perforations or extraction is the line of treatment.[3] Immediate sealing with biocompatible materials offer a positive outcome. Few of the ideal requirements of a repair material include:

Biocompatibility, it should provide adequate seal, be osteogenic, bacteriostatic, radioopaque.[4]

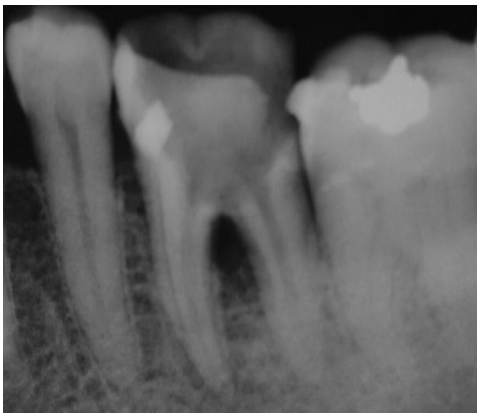
In this case report Biodentine was used as furcal perforation repair material. Biodentine (Septodont, Saint Mair-des-Fosies, France) is available in powder and liquid form. Powder consists of Di calcium silicate, Tri calcium silicate, calcium carbonate and oxide, iron oxide, zirconium oxide whereas calcium chloride, hydrosoluble polymer contributes the liquid. Invitro studies of Biodentine showed good biocompatibility, bio activity, high compressive strength and a shorter setting time of 12 minutes.[5] Thic case report discusses about the furcal perforation and its management using bioactive material – Biodentine.

CASE REPORT

A 38 year old female patient reported to the Department of Conservative Dentistry and Endodontics with history of attempted root canal in right lower back tooth region and pain in the same region since 15 days. Intraoral examination revealed temporary restoration in respect to right mandibular first molar (46) and the tooth was tender to percussion. On radiographic examination, previous attempt of access opening and incomplete root canal treatment with furcal perforation was noted. Also the intra oral radiograph revealed radiolucency in the furcal region. A diagnosis of incomplete root canal treatment with furcal perforation was made and a non surgical endodontic treatment followed by sealing the perforation was planned with 46. Written consent was taken and administration of local anaesthesia was done. Removal of old temporary restoration was done under rubber dam isolation. Pulp chamber irrigation was done and clinically a perforation was visualized in the centre of the pulp chamber. The canals were located and working length determination was done using apex locator. Canals were negotiated using mani K- Files and

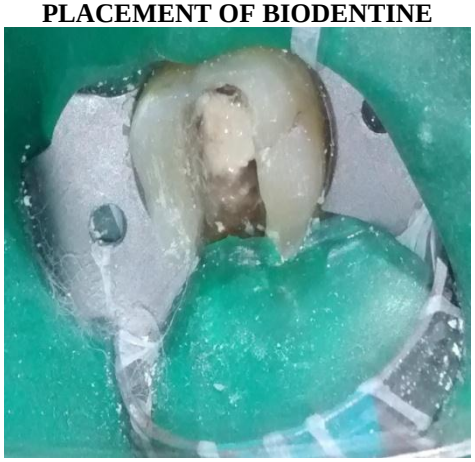
enlarged till 25 6% using neo endo rotary files with intermittent saline and 3% sodium hypochlorite irrigation.After the canals were blocked using the Guttapercha cones, Biodentin was mixed according to the manufacturer's instructions and was placed on the perforation site. The gutta percha cones were then removed and an inter appointment calcium hydroxide intra canal medicament was placed in the canals. A cotton pellet was placed and temporary restoration was done and the patient was recalled after 10 days for review and completion of the root canal treatment. During the next appointment patient was asymptomatic and the tooth was less tender to percussion. The temporary restoration and the intracanal medicament was removed, canals were irrigated and dried. Master cone selection was done and the canals were obturated using sealapex sealer and corresponding gutta percha cones. Permanent access cavity restoration was done using resin modified glass Ionomer cement and patient was kept under observation and was recalled after 6 months and a follow up radiograph revealed healing in the furcation region.

PRE OPERATIVE IOPAR



FURCAL PERFORATION

PLACEMENT OF BIODENTINE



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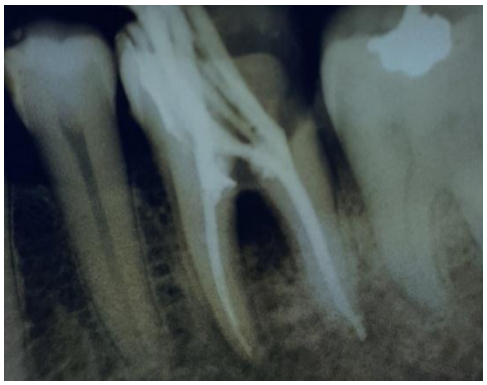

HEALING AFTER 6 MONTHS FOLLOW UP

DISCUSSION

Furcal perforation often presents a challenging scenario to the clinicians as it results in periodontitis and irreversible attachment loss.[6] Literature supports use of different materials namely amalgam, composite, ZOE, MTA, Biodentine.[7] Biodentine is composed of tri calcium silicate. According to few studies, MTA is composed of calcium aluminate and calcium sulphate which decreased the mechanical strength and led to a longer setting time.[8] Alterations in the composition of Biodentine were made by adding calcium carbonate and

water based solution that contained calcium chloride and carboxylate in the liquid which facilitated to reduce the setting time to 12 minutes.[9] Studies conducted by Wattanapakkavong and Sriswan, revealed that Biodentine released higher concentrations of TGF-b1 from dentine which has a greater mineralizing potential than MTA. Few other studies conducted by Luo etal proposed Biodentine has a greater remineralizing potential as it increases proliferation, migration and adhesion of human dental pulp stem cells.[10] Perforation repair materials that are used in multirooted teeth should be able to bear the maximum occlusal forces which are shown upto 640N.[11] A study done by Greech etal showed highest compressive strength of Biodentine due to its lesser L/P ratio.[12] Also, Biodentine has lesser solubility, superior sealing ability and greater anti microbial action.[13] A study which was done to evaluate the dislodgement resistance of few of the repair materials concluded that the bleeding in the perforation site should be controlled before the application of any of the reparative materials. This mechanism is explained by the clogging of the dentinal tubules by the proteins and different cells in the blood which created gaps between the repair material and dentin.[14] Silva etal, in their study confirmed that Biodentine and MTA showed similar results when used as a furcal repair material.[15] Studies conducted by Ho etal concluded that Biodentine promotes dentin; bone healing and regeneration.[16] One limitation of Biodentine is the lesser radioopacity of Biodentine when used in dentinal region as the cement was not adequately visible on radiographs.[17] According to a review, it was seen that the sealing ability and handling properties were superior tyo that of MTA Angelus when used as a furcal perforation sealing material.[18] A comparative study showed the formation of tag like structures which explains the increased resistance to dislodgement forces of Biodentine and also increased bond strength of the material to dentine can be explained by the higher uptake of calcium and silicon ions into dentin.[19] In contrast to this, Biodentine revealed poor wash out resistance.[20]

In the present case, Biodentine was preferred as a furcal perforation repair material and on 6 month follow up patient was found asymptomatic and a recall radiograph revealed healing and the bone formation in the furcal region.

CONCLUSION

Prognosis of the endodontic treatment is affected by the iatrogenic accidents that occur during the course of the treatment. Perforation is one such errors which has a questionable prognosis if not sealed immediately and also the choice of the repair material, size and location of the perforation are few of the factors that decide the success of the treatment. It is required to understand the canal anatomy and morphology especially of the multi rooted teeth which hwlps in minimizing the procedural errors. Also many studies are required with a good follow up interval to decide upon the furcal perforation repair materials.

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