

# Treatment of two large furcal perforations with separated instrument in a mandibular right first molar- A case report

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## INTRODUCTION

Perforation is the communication between root canal system and periodontal tissues. According to Glossary of endodontics terms, perforation is defined as “The mechanical or pathologic communication between the root canal system and the external tooth surface”(1). Perforations can occur naturally (or pathologically), as in the case of root resorptions or artificially, as in the case iatrogenic perforations. Perforations hinder proper sealing of root canal system and can lead to chronic infection(2). Microbial infection at the perforation site can either originate from root canals or from the oral cavity through gingival sulcus. Early diagnosis and treatment of perforation is important to prevent tooth loss. Prevalence of iatrogenic root perforation ranges from 3% to 10%(3). Fuss et al. classified perforations into fresh,old,small,large,coronal,crestal and apical with respect to crestal bone.(3)This classification helps in decision making during treatment.

Diagnosis of perforations can be difficult. Perforations present either buccally or lingually is difficult to detect through two-dimensional radiography due to superimposition of tooth structure. Apex locators are more reliable in detecting root perforation than radiographs(4). CBCT can detect and localize perforations effectively and is indicated if two-dimensional radiography is inadequate(5). Prognosis of root perforation depends on time, size and location of perforation with respect to crestal bone and the presence or absence of bacterial contamination at the site of perforation(6).

## CASE REPORT

A 16-year-old female patient named Neeraj reported to the dept of conservative dentistry and endodontics with a chief complaint of mild, intermittent, localized pain in lower right first molar region. Previously patient had severe pain due to caries in the same tooth and was treated by a private practitioner. Root canal therapy was initiated. Patient's pain was not relieved followed by the treatment and after 3 months patient herself consulted our clinic. Upon examination, the lower right first molar region was restored with temporary restoration and was tender on percussion. There was no sign of swelling or sinus with respect to the tooth. A periapical radiograph revealed perforation of pulpal floor and a separated instrument with respect to the distal canal. Probing of gingival sulcus did not reveal pockets and no pathological changes were observed in gingiva.

## PROCEDURE

The treatment was performed under 16x (Moeller Wedel) magnification with proper rubberdam isolation. Removal of temporary filling revealed two large perforations extending into the furcation. First, bleeding was controlled with copious irrigation with 1.5% sodium hypochlorite and then with sterile cotton pellet soaked with the same. Canal orifice was located and working length was determined using radiograph. The separated instrument in the distal canal was bypassed. Canals were prepared till no 20 k-file and number 20 gutta-percha cones were inserted into the canal to maintain patency.



Pre-operative radiograph



Intra-operative photograph

The perforated area was plugged with saline soaked collagen sponge with area of 1mm square. The collagen sponge was pushed inside the bony crevice which would act as a hard base for bio-ceramic material. Over the collagen sponge 2 mm thick MTA Angelus base was mixed and applied. After 15 min, A 2mm thick dual cure RM-GIC layer was applied over set Angelus MTA and light cured. The number 20 GP cones were removed and the canals were filled with calcium hydroxide medicament. Access cavity was restored with temporary restorative material and patient was recalled after 1week. In the next appointment, patient reported no pain during one-week time period and tooth was slightly sensitive to percussion. Temporary filling was removed. There was no sign of bleeding and calcium hydroxide was removed with 15 number H-file. The canals were prepared with Neo-endo gold flex files until Number 25 with 4% taper along with intermittent and copious 5% sodium hypochlorite irrigation and saline. The canals were obturated by lateral condensation technique using GP cones and ZOE sealer. A bonded composite restoration was used to restore access cavity.



Post-obturation photograph



Immediate Post-operative radiograph



9 months Post-operative radiograph

Patient reported after 9 months for a follow-up. Upon questioning patient was completely asymptomatic after treatment. Clinical examination revealed no abnormal findings with respect to hard and soft tissue. Gingival probing depth was normal with no sign of pockets. Radiographic examination revealed no sign of improvement in terms of increase in apical bone density.

## **DISCUSSION**

Perforation repair is a complex treatment modality which depends on the factors like time between perforation and repair, size of perforation, location and bacterial contamination of the site of perforation(7). Other Intra-operative factors like isolation and magnification can also influence long term outcome. Lantz and Persson studied perforation repair in dogs by artificially creating perforations in teeth and repairing them either immediately or after delay. Greatest healing occurred when repair was done immediately(8). In our case, patient reported 3 months after the primary root canal treatment. Himel et al conducted a study to evaluate the effect of different material used to repair perforations. They observed that prognosis also depends on size of perforation(9). In our case, perforation connected with crestal bone. Crestal root perforations results in lower prognosis due to bacterial contamination and epithelial migration from gingival sulcus.

CBCT is a valid diagnostic tool to detect perforations. It gives clinician an opportunity to completely visualize the perforation along with its location, size and surrounding bone(10). Advent of MTA and other calcium silicate bio-ceramic materials have near ideal properties as a repair material. Researchers have shown cementum formation at the MTA and tissue interface(11). In case of significant bone loss at the perforation site a matrix is needed to fill the defect(12). In the above case a collagen sponge was used as a matrix to fill the osseous defect. 9-month post-operative radiograph revealed no sign of improvement. In our case, two perforations were large and patient reported after 3 months of primary root canal therapy, which might have contributed to the non-healing of peri-apical lesion(13). Clinically patient was completely asymptomatic and there was no sign of pocket or any other soft tissue pathology. A separated instrument in the distal canal was bypassed instead of a retrieval as there would be further tooth structure loss for the purpose of staging platform and increase in the probability of tooth fracture(14). Further studies are required to examine tooth's response towards large perforation defects with time lapse between occurrence of perforation and its repair with bioceramic materials.

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