



MANAGEMENT OF FURCAL PERFORATION USING BIODENTINE – A CASE REPORT

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ABSTRACT

Management of furcal perforation in a root canal retreatment is often challenging as the outcome of the perforation sealing depends on several parameters. The introduction of several bioactive cements and magnification systems has made the sealing of perforations easier and the outcome more predictable. Current advances in endodontics and biomaterials has made the recovery of tooth structure and function possible even in the most complicated cases. Despite the breakthroughs in techniques and resources, furcal repair remains taxing. This case report shows successful management of multiple furcal perforation with a questionable prognosis in root canal retreatment using biodentine.

KEYWORDS : retreatment, furcal perforation, biodentine, endodontic mishap.

INTRODUCTION

A clinician encounters several undesirable situations during retreatment which can affect the prognosis of the treatment. One such situation is a furcal perforation. Failure to detect and treat a perforation will cause a chronic inflammatory reaction of the periodontal apparatus.¹

Furcal perforation is often an iatrogenic error that occurs during access opening due to a misaligned bur or while exploring for the orifices of canals in the floor of the pulp chamber.¹

Perforations of the crown can occur, either peripherally through the sides of the crown or through the floor of the chamber into the furcation. Such perforation are managed surgically or non-surgically. Various materials have been used in repairing perforations including zinc oxide eugenol, amalgam, calcium hydroxide, glass ionomer, resin-modified glass ionomer, mineral trioxide aggregate, calcium enriched mixture cement and biodentine.^{2,3}

This case report shows successful management of multiple furcal perforation in a mandibular first molar with a questionable prognosis using biodentine.

The case reported was done using dental loupes with a magnification of 3x.

CASE REPORT

A 29-year-old male patient reported to the Department of Conservative Dentistry and Endodontics with pain and swelling in the lower right back tooth region for 2 days. Patient gave a history of incomplete root canal treatment (RCT) with

respect to (w.r.t) the same tooth 1 month ago.

On clinical examination, a prepared tooth with fractured temporary restoration and intraoral swelling was seen w.r.t 46. The tooth was tender on percussion. On radiographic examination, radiolucency below radiopacity involving the pulpal chamber and approaching furcation was detected w.r.t 46. Periapical radiolucency along with furcal loss of bone architecture was seen w.r.t 46. There was no filling material detected. A diagnosis of acute dentoalveolar abscess secondary to primary root canal treatment was made and treatment plan was to attempt retreatment w.r.t 46 followed by full coverage crown.



Figure 1. 1(a) Pre-treatment Intra-oral Picture. 1(b) Preoperative Radiograph

Owing to the extent of intra-oral swelling and the badly mutilated condition of the tooth, the access opening was done without rubber dam, under cotton roll isolation and high

evacuation suction. On gaining access to the pulp chamber, three perforations were found one next to each root canal orifice.

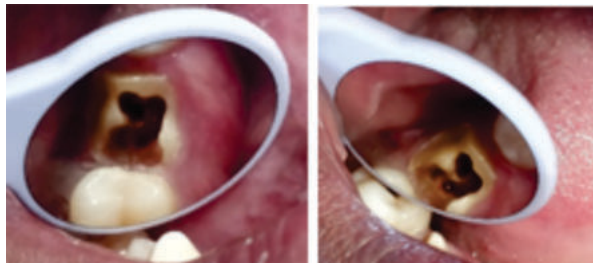


Figure 2. Detection Of Multiple Perforations On Gaining Access

On detecting the orifices, 10K files (Mani, Prime Dental Products Pvt. Ltd, India) were used to determine the working length. Cleaning and shaping of the canals were done till F1 Protaper Gold w.r.t mesial canals and till F2 Protaper Gold w.r.t distal canal with EDTA as a lubricant (Glyde - Dentsply Maillefer, Ballaigues, Switzerland) and 3% sodium hypochlorite as an irrigant.

Once the cleaning and shaping was completed, the orifices were blocked with the gutta percha and biodentine was used to seal the perforations. A radiograph was taken to confirm the sealing of the perforations. Calcium hydroxide was placed as intracanal medicament (ICM) and the tooth was temporarily sealed with Cavit.

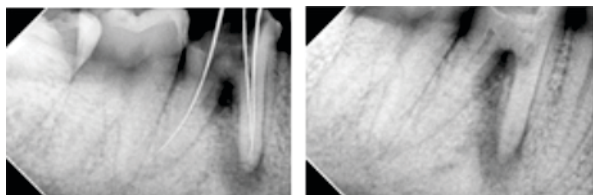


Figure 3. 3(a) Working Length Determination. 3(b) Verifying The Compaction Of Biodentine

Patient was prescribed with antibiotics (Amoxicillin + Clavulanic acid 625 mg) and analgesics (Aceclofenac + Paracetamol) for 5 days after thorough drug history. The intra-oral swelling and pain subsided within 5 days of cleaning and shaping of the canals along with sealing the perforation.



Figure 4. Resolution Of Intra-oral Swelling After 5 Days

Calcium hydroxide was used as ICM for 2 weeks and freshly mixed triple antibiotic paste was used as ICM for next 2 weeks.

After 4 weeks, paper points were used to check the dryness of the canal. Master cone fit was confirmed and obturation was done using single cone technique and AH plus sealer. Post

endodontic restoration was done using Type IX GIC.

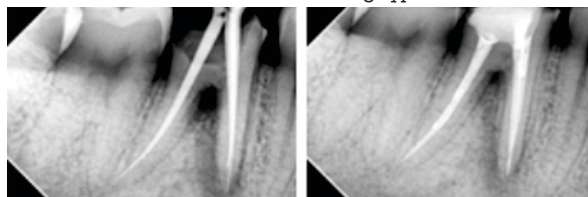


Figure 5. 5(a) Master Cone Fit. 5(b) Post Obturation Radiograph

Full metal crown was placed after 10 days of obturation. The patient was recalled after 3 months for follow up. Considerable increase in the bone architecture was appreciated. The tooth was functioning without any symptoms. The patient is currently kept under monitoring and will be recalled at 6 months and 1 year for further follow up.

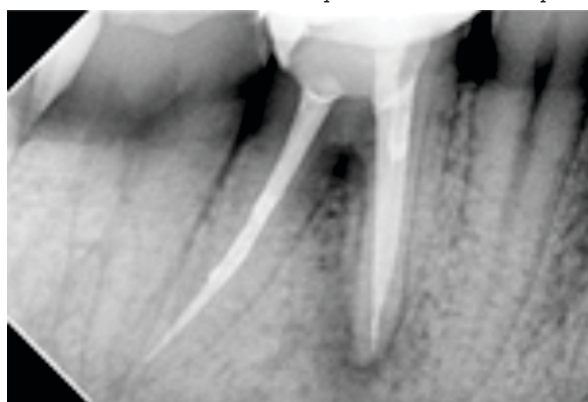


Figure 6. 3 Month Follow Up

DISCUSSION

Furcal perforations represent pathologic or iatrogenic communication between the root canal space and the attachment apparatus.¹

Clinically, a furcal perforation can be determined by the presence of profuse bleeding which is bright red in colour and maybe pulsatile. If an apex locator is used by inserting the file in the perforation, the device will show an extended working length prematurely.¹

Radiographically, a furcal perforation can be seen as a radiolucency in the floor of the chamber that forms a communication between the pulp space and the periodontal attachment.¹

Variables considered during the management of furcation include level, location, size, and time of perforation. Chronic perforations pose treatment challenges making retreatment of such cases difficult.

A study has reported that perforations are the second greatest cause of failures accounting for 9.62% of all unsuccessful cases.⁴ Therefore, this communication between the root canal system and the periodontal apparatus should be sealed with a biocompatible material as soon as possible.

Biodentine (Septodont, Saint-Maur-des-Fosses, France) is a bioactive cement, in which the main component of the powder is tricalcium silicate, with addition of zirconium dioxide and calcium carbonate; the liquid has calcium chloride as a setting accelerator. Biodentine has been reported to provide good biocompatibility, bioactivity, high compressive strength, and a short setting time of 12 min.⁵ Biodentine has a high compressive strength of 220 MPa and elastic modulus of 22 GPa, which is very similar to dentin itself.⁶

In the current case, the perforation was chronic with considerable bone loss in the furcation and compromised coronal structure. Even with questionable prognosis, it was decided to repair the perforation with a biocompatible material among the available treatment options.

Recent magnification tools such as dental loupes and operating microscopes have allowed more precise management of perforation cases in root canal retreatment procedures.

Long-term, well-designed clinical trials are required for better assessment of biodentine as furcal perforation sealing material in root canal retreatment for teeth with and without extensive coronal tooth structure loss.

CONCLUSION

Biodentine has the potential as a material for repair of furcal perforation. The prognosis of perforated teeth is better today than it was in the past, and this is 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.

REFERENCES

- [1] Heredia, A. L., Bhagwat, S. A., Mandke, L. P., & Heredia, A. L. (2016). Biodentine as material of choice for furcal perforation repair—A case report. *Ann Prosthodont Restor Dent*, 2(2), 54-7.
- [2] Unal, G. C., Maden, M., & Isidan, T. (2010). Repair of furcal iatrogenic perforation with mineral trioxide aggregate: two years follow-up of two cases. *European journal of dentistry*, 4(04), 475-481.
- [3] Eghbal, M. J., Fazlyab, M., & ASGARY, S. (2014). Repair of an extensive furcation perforation with CEM cement: A case study.
- [4] Seltzer, S., Bender, I. B., Smith, J., Freedman, I., & Nazimov, H. (1967). Endodontic failures—an analysis based on clinical, roentgenographic, and histologic findings: part I. *Oral Surgery, Oral Medicine, Oral Pathology*, 23(4), 500-516.
- [5] Cardoso, M., dos Anjos Pires, M., Correlo, V., Reis, R., Paulo, M., & Viegas, C. (2018). Biodentine for furcation perforation repair: an animal study with histological, radiographic and micro-computed tomographic assessment. *Iranian endodontic journal*, 13(3), 323.
- [6] Saidon, J., He, J., Zhu, Q., Safavi, K., & Spångberg, L. S. (2003). Cell and tissue reactions to mineral trioxide aggregate and Portland cement. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology*, 95(4), 483-489.