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CASE STUDY

FURCAL PERFORATION REPAIR WITH BIODENTIN: ONE YEAR FOLLOW UP OF A CASE

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ABSTRACT

Furcal perforation is usually an undesired complication that can occur during preparation of endodontic access cavities or exploring canal orifice of multirooted teeth. Inadequacy of the repair materials has been a contributing factor to the poor outcome of repair procedures. On the basis of several studies carried out and assess the physical and biologic property of Biodentin, it was concluded that this material may be suitable for closing the communication between the pulp chamber and the underlying periodontal tissues. The purpose of this case report was to describe the treatment of a furcal perforation using Biodentin in a mandibular molar. The perforation site was irrigated with saline solution and sealed with Biodentin with internal matrix. The teeth was endodontically treated and coronally restored. After one year, the absence of periradicular radiolucent lesion, pain and swelling along with functional tooth stability indicated a successful outcome of the sealing procedure.

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INTRODUCTION

Furcal perforation is usually an undesired complication that can occur during preparation of endodontic access cavities in multirooted teeth (Bargholz, 2005). These undesirable situations such as excess removal of tooth structure or perforations occur during attempts to locate canals or as a direct result of failing to achieve straight line access to the canals. In the process of searching for canal orifices, perforations of the crown can occur, either peripherally through the sides of the crown or through the floor of the chamber into the furcation (Frank, 2002). The practical method adopted to treat the endodontic furcation perforation is a non-surgical coronal approach (George *et al*., 2006). Various materials have been used in repairing perforations including zinc oxide-eugenol, amalgam, calcium hydroxide, composite resin, glass ionomer and resin-modified glass ionomer and Mineral Trioxide Aggregate (MTA) (Fuss and Trope, 1996; Unal *et al*., 2010). Biodentine (Septodont, Saint Maur des Fosses, France) is a new calcium silicate based restorative cement with dentin like mechanical properties, which can be used as a dentin substitute on crowns and roots with usage similar to MTA (Alicja Nowicka *et al*., 2013). 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 (Marta Valles *et al*., 2013; Padma Gandi *et al*., 2013). The aim of this case report is to present a successful treatment of iatrogenic furcal perforation by Biodentin.

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Case report

A healthy 35yr-old female was referred to the Department of Endodontics, Goa Dental College and Hospital with chief complaint of pain in the lower left first molar since two days. Patient gave a history of initiation of root canal treatment at a private clinic two days back. Clinical examination showed mild tenderness to percussion and palpation test. The mean probing pocket depth was within normal limits. The radiographic examination showed a slight radiolucent area in furcal region of tooth 36. Based on patient clinical and radiological examination Iatrogenic furcal root perforation was diagnosed. Treatment procedure was explained to the patient and informed consent obtained before the root canal treatment was initiated. Profound anesthesia was given. The tooth 36 was isolated using a rubber dam. The temporary dressing was removed. Approximately 2 mm, circular furcal perforation was seen on the lingual aspect of the tooth. There was bleeding on probing at the perforation site.

Figure 1. (A) Radiograph showing perforation in 36 at Furcal area. (B) Furcal perforation in 36. (C) Canal orifice temporarily blocked with gutta-percha. (D) Furcal perforation sealed with biodentin. (E) RVG image of sealed perforation

Figure 2. (A) Working length confirmation. (B) Master cone image. (C) Post-obturation RVG image

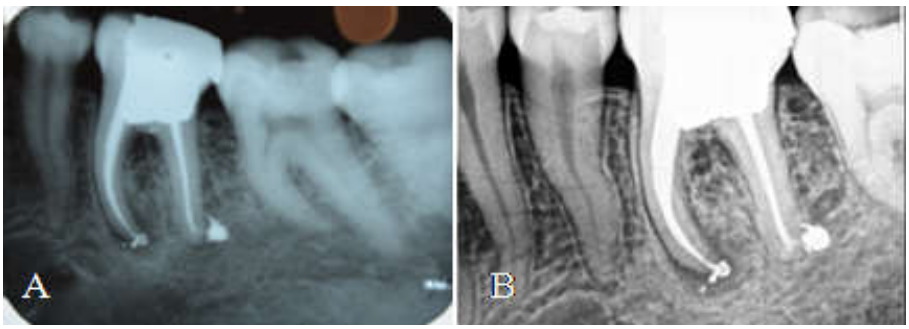

Figure 3. (A) Three months follow up. (B) One year follow up

Soft tissue growth through the perforation site was extirpatated with the help of a sharp instrument. Hemorrhage was controlled with copious irrigation with small cotton pellet soaked in normal saline. Perforation area and pulp chamber were cleaned with normal saline solution. Mesiobuccal, mesiolingual and distal canals were blocked temporarily with gutta-percha cones (#20, 2%). Ab-gel (Sri Gopal Krishna Lab, Mumbai, India)) was placed in perforation site to provide a internal matrix for Biodentin placement. Biodentine was manipulated in an Amalgamator for 30 seconds and the material was carried to the perforation site using an amalgam carrier. The material was then adapted to the cavity with a cotton pellet without pressure. Once the material had set any excess material was removed with a curette. Gutta-percha points which were temporarily placed in the root canal were removed. Working lengths of the canals were determined with an Apex locator (Propex II, Dentsply, Maillefer Ballaigues, Switzerland) and confirmed radiographically. The mesial and distal canals were cleaned and shaped using Protaper files (Dentsply Maillefer, Ballaigues, Switzerland) in a crown-down technique with 5.25% sodium hypochlorite irrigation. The root canals were then obturated with gutta-percha points and AH plus (Dentsply, DeTrey Konstanz, Germany) using the lateral condensation technique. The tooth was temporary filled with Cavit temporary restoration material (Cavit-G, 3M ESPE, St. Paul, Minnesota, USA) and patient recalled for follow up after a week. Patient did not complain of any type of sign or symptom related to that tooth. Permanent restoration was completed for the same tooth and patient recalled after three months and one year for check up.

DISCUSSION

The prognosis of perforation depends on the location, size and time of contamination of the lesion (Fuss and Trope, 1996). In present case the time lapse between detection of perforation was less than two days, hence it was decided to seal the perforation and complete the root canal treatment in same appointment. Immediate sealing prevents the chance of contamination at perforation site and facilitates healing (Main *et al*., 2004). Size of perforation is also an important factor to determine prognosis of Furcal perforation. In this case the size of perforation was approximately 2 mm which could result in extrusion of sealing material in crestal bone area. So Ab-gel was used to avoid the extrusion of the sealing material and consequent tissue inflammation (Holland *et al*., 2007). Biodentine is a new dentine substitute composed mainly of tricalcium silicate. The biocompatibility of this material was

recently proven in invitro and in vivo studies. Biodentine has a good sealing ability, high compressive strength, and short setting time (Grech *et al*., 2013; Raskin *et al*., 2012; Desai and Himel, 2009; Koubi *et al*., 2012; Kayahan *et al*., 2013). It is biocompatible and has favorable biomineralization properties and sufficient push-out bond strength for use as a repair material in root canals (Aggarwal *et al*., 2013; Laurent *et al*., 2012; Guneser *et al*., 2013).

Conclusion

Biodentin has good potential of sealing furcal perforation and can be used as an alternative for MTA.

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