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Perforation repair with egg shell - Case Reports on non surgical Furcation Perforation repair with egg shell

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Abstract

Furcation perforations as a possible complication during a root canal treatment may increase the risk of failure for the affected tooth. The influencing factors include: the location and the size of the perforation, a potential microbial colonization of the endodontic system, the time lapse between the occurrence of the perforation and repair, and the filling material. Decontamination at the perforation site and in the remaining root canal system is essential for long-term success. This case report present the treatment of a mandibular second molar with apical periodontitis and iatrogenic furcation perforation in 52-year-old male patient. Miraculous result was found when egg shell used for perforation repair.

Keywords: Furcation perforation; egg shell.

Introduction

Root perforations are undesired complications of endodontic treatment. Once a perforation has been diagnosed, treatment must be rendered to seal the perforation site effectively to minimize injury and prevent contamination of the surrounding periodontal attachment apparatus. Although successful treatment and prognosis depend on many factors, the location of the perforation and the time lapse between exposure and repair are the two most important factors for determining the treatment and prognosis of the tooth.[1,4] Recent developments in the techniques and materials utilized in root perforation repair have dramatically enhanced the prognosis of both surgical and nonsurgical procedures. The ideal material for perforation repair should be antibacterial, non-cytotoxic, non-absorbable, biocompatible and able to induce formation of hard tissue, particularly cementum, over the material and also provide a three-dimensional seal.[5] A wide range of materials have been suggested for surgical and nonsurgical repair of perforations including zinc oxide eugenol, calcium hydroxide, Cavit, amalgam, glass ionomer, composite resin, mineral trioxide aggregate (MTA), chitosan & egg shell. This article presents one clinical case of nonsurgical root perforation repair by egg shell.

Case report

A healthy 52-year old male was referred to our department with a continuous dull pain in the left mandibular region, which had started after initiation of root canal treatment on the second molar by general dentist about two weeks before. The intraoral examination revealed that the tooth was sealed coronally with temporary cement. Tooth was sensitive to percussion and palpation. The mean probing pocket depth was within normal level (2 mm). Periradicular radiographic examination revealed a little

radiolucent area in the furcal region of left second mandibular molar and apical radiolucencies from pulp necrosis were also observed [Figure 1].

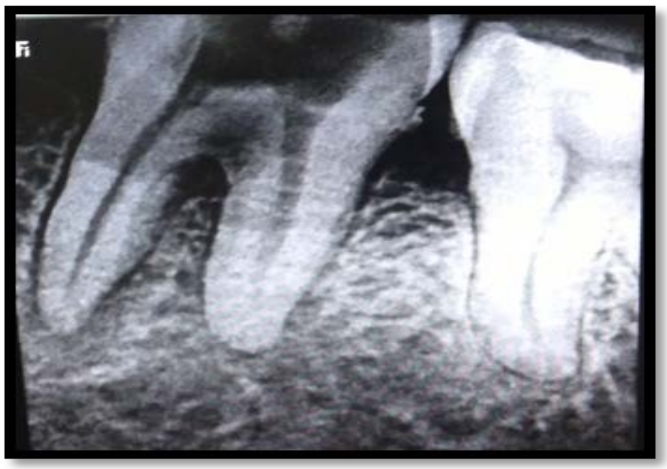

Figure : A

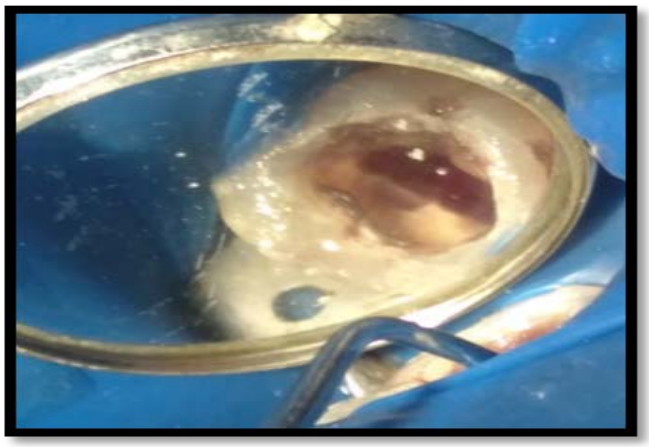

Figure B

Figure 1: (A) Initial periradicular radiograph of a mandibular left second molar showing a large furcal perforation and apical radiolucencies in the patient (B) Intraoral photograph showing root canal and a large furcal perforation.

Treatment options which were indicated for the tooth were extraction and non-surgical repair of the perforation. As per the patient preference, the option of saving the tooth via a non-surgical procedure, that is, furcal perforation repair with chitosan was chosen. After the administration of local anesthesia 2% lidocaine with 1:100,000 epinephrine, the tooth was isolated with a rubber dam, the temporary restorative material was removed and the access cavity was prepared, and the perforation area could be clinically seen. Hemorrhage was controlled with copious irrigation with 0.9% saline solution. A cotton pellet was placed in the orifice of perforation. The working length was then checked by using an apex locator (Novapex, Fórum Technologies, Israel). The root canals were cleaned and shaped using rotary files (M2 files, DentsplyMaillefer, Ballaigues, Switzerland) in a crown-down technique. Before the use of each instrument, an irrigation of the canal was performed using a syringe (27-gauge needle) containing 1 mL of 2% chlorhexidine (CHX) gel (Endogel, Itapetininga, SP, Brazil),and immediately rinsed afterwards with 3 mL of saline solution. After the root canals were dried with paper points, they were obturated. For obturation, gutta-percha points were used and AH plus (Dentsply) was used as a root canal sealer. The root canals were then filled using the lateral condensation technique [Figure 2].

Figure 2: Periradicular radiograph of a mandibular left second molar showing obturated root canal.

After the obturation of the root canals, the cotton pellet was removed from the perforation, exposing the site of the perforation. The furcal perforation was irrigated with saline solution & 2% chlorhexidine (CHX) gel. Egg shell powder placed into the pulp chamber with a cement carrier [Figure 3]. It was then gently packed with a cotton pellet to obtain a good adaptability.

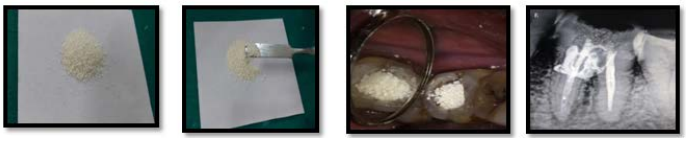

Figure 3: (a) Dispensing of egg shell powder (b) use of cement carrier for placing egg shell into the pulp chamber; (c) intraoral picture of egg shell being placed into the furcal perforation (d) Radiograph of egg shell being placed in to the furcal perforation.

Afterward, the tooth was restored using glass ionomer cement [Figure 4]. The patient was then referred for a permanent coronal restoration.

Figure 4 : (a) Radiograph of restoration with GIC; (b) Intraoral photograph of restoration with GIC; (c) 1 month follow up radiograph; (d) 3 months follow up radiograph; (e) 6 months follow up radiograph showing adequate sealing of the perforation region and no radiolucency at the furcal area in the mandibular left second molar of the patient.

The clinical examination showed that the tooth had no pain, and no response to percussion, palpation and there were no attachment loss.

Discussion: Why egg shell….?

The formulations of eggshell are being used as mineral and trace element supplying agent. [6], [7] The various formulations comprising eggshell powder have been examined in rats. [6-9] In recent times, this eggshell derived material has been introduced as perforation repair material substitute. [10] There are few studies with surface modified eggshell as osteoconductive bone filling material for bone regeneration with variable benefit. [8], [9] After histomorphometrical evaluation at 4 and 8 weeks interval, it was confirmed that the eggshell-derived powders have excellent new bone formation ability. [8-11] This has led to the curiosity to prepare the EHA from eggshell waste in a very economical way. [12] Even the material properties are superior to the commercially available perforation repair materials. [13] The material is chemically pure form of nanocrystalline HA with eggshell origin alike any other SHA. [13] , [15] The different forms of HA and origin are in use as perforation repair substitute since long time. [12], [14-16]

To achieve a better tissue response, the perforation sites were disinfected with 2% chlorhexidine gel. In this case, we decided not to use sodium hypochlorite (NaOCl) because it is known that it can be extremely aggressive, and cause damage to the surrounding tissues. Chlorhexidine has been recommended by several authors as an auxiliary chemical substance, as, in addition to being relatively non-toxic when compared to NaOCl, it has excellent antimicrobial power and prolonged time of action. These properties may offer clinical advantages of using chlorhexidine in furcal perforations.

Conclusion

Egg shell has been used successfully in this study for perforation repair since it is able to induce formation of hard tissue, particularly cementum, over the material and also provide a three-dimensional seal.

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