ISSN- O: 2458 - 868X, ISSN–P: 2458 – 8687
Index Copernicus Value: 49. 23
PubMed - National Library of Medicine - ID: 101731606

International Journal of Medical Science and Innovative Research (IJMSIR)
IJMSIR : A Medical Publication Hub
Available Online at: www.ijmsir.com
Volume – 3, Issue – 6, December - 2018, Page No. : 75 - 78

Non-surgical Management of Necrotic Immature Permanent Teeth using a novel material Biodentin- A case report

Anil K. Tomer[1], Panna Mangat[2], Akankshita Behera[3], Nitish Mittal[4]

[1]Professor & Head, Department of conservative dentistry and Endodontics, Divya Jyoti College of Dental Sciences and Research, Ghaziabad.

[2]Professor, Department of conservative dentistry and Endodontics, Divya Jyoti College of Dental Sciences and Research, Ghaziabad.

[3]Post Graduate Student, Department of conservative dentistry and Endodontics, Divya Jyoti College of Dental Sciences and Research, Ghaziabad.

[4]Post Graduate Student, Department of Oral Medicine and Radiology, Divya Jyoti College of Dental Sciences and Research, Ghaziabad.

Corresponding Author: Dr. Akankshita Behera, PG Student, Dept of Conservative Dentistry and Endodontics, Divya Jyoti College of Dental Sciences and Research, Modinagar, Ghaziabad, Uttar Pradesh 201204, India

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

When there is trauma caries or othe pulpal diseases there is incomplete root formation as there will be necrosis of the pulp and interruption in dentin formation, thus there is cessation of the root development.since the apex is open and wide, the walls are fragile and thin and thus instrumentation to the root canal is difficult and hence is difficult to obtain an apical seal. Apexification is defined as the method to induce a calcified barrier in a root with an open apex or the continued apical development of an incomplete root in teeth with necrotic pulp.

Keywords – Apexification, Biodentine, Open apex

Introduction

During eruption of the tooth the completion of root development and closure of the apex takes place upto 3 years. When there is trauma caries or othe pulpal diseases there is incomplete root formation as there will be necrosis of the pulp and interruption in dentin formation, thus there is cessation of the root development.since the apex is open and wide, the walls are fragile and thin and thus instrumentation to the root canal is difficult and hence is difficult to obtain an apical seal. So in order to achieve an optimum apical seal, and to allow the condensation of the material to the apex, it is necessary to create an artificial apical barrier or inducing the closure of apical foramen with a calcified tissue.[1]

The root canal system consists both aerobic and anaerobic bacteria. A combination of antibiotics (metronidazole, ciprofloxacin, and minocycline) is used to eradicate the infection causing periapical lesions as giving single antibiotic can be ineffective to the infection in the root canal system. Since minocycline causes discoloration of

the tooth it is advised to first apply bonding agent before placing triple antibiotic paste.

Apexification is defined as the method to induce a calcified barrier in a root with an open apex or the continued apical development of an incomplete root in teeth with necrotic pulp.[2] In this method a barrier is placed in the open apex area to induce calcified barrier in the pariapical region. After setting of the barrier immediately obturation is done with the obtura pellets with warm vertical condensation.[3] A number of materials have been used including tricalcium phosphate, freeze dried bone, freeze dried dentin, collagen calcium phosphate, mineral trioxide aggregate.[4] MTA has been used widely for one-visit apexification but due to its long setting time, low flow capacity[5], poor handling characteristics.[6] Recently, a new calcium silicate based material Biodentin have been used thar overcomes the negative implications of MTA.[7]

The purpose of the present article is to manage the closure of root apex in a necrotic immature permanent teeth with wide open apex using Biodentine in combination with triple antibiotic paste.

Case report

A 18 year old male patient came to the department with a chief complaint of pain in upper left front tooth region. Patient had a history of trauma from falling due to accident 10 years back. The vitality of the tooth was checked by electric pulp tester which showed negative response. On radiographic examination it revealed a necrotic immature permanent tooth with a wide open apex with radiolucency present in the apical region (Figure 1). The tooth was isolated using rubber dam and access opening was done under local anesthesia. Working length is then determined by radiograph. Shaping and cleaning was done using no 90 K-file using circumferential filing motion. After each file irriagation is done with 2.5% NaOCl and saline. The canal was the dried with paper points. Triple antibiotic paste was then place in the root canal and the patient was recalled after 21 days. After 21 days the canal was irrigated with lower concentration of NaOCl and the canal was dried using paper points. Biodentine was then place in the root canal upto apex using plugger achieve an apical seal or apical barrier. Biodentine was placed into the root canal for upto 4mm for achieving apical plug. Then canal was obturated with warm vertical condensation using obtura pellets. Composite restoration was then done to seal the cavity.

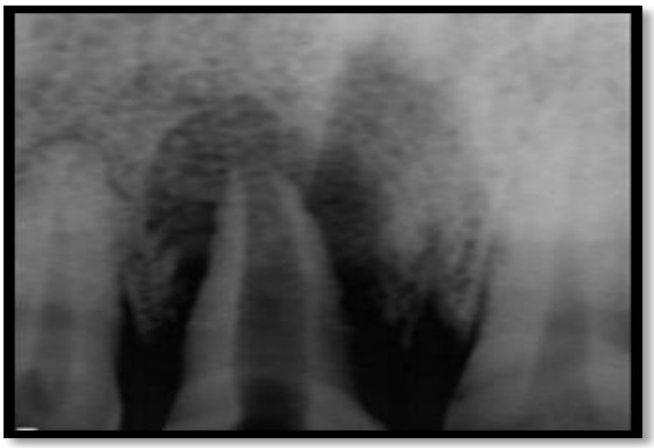

Figure 1: Pre-operative radiograph showing open apex

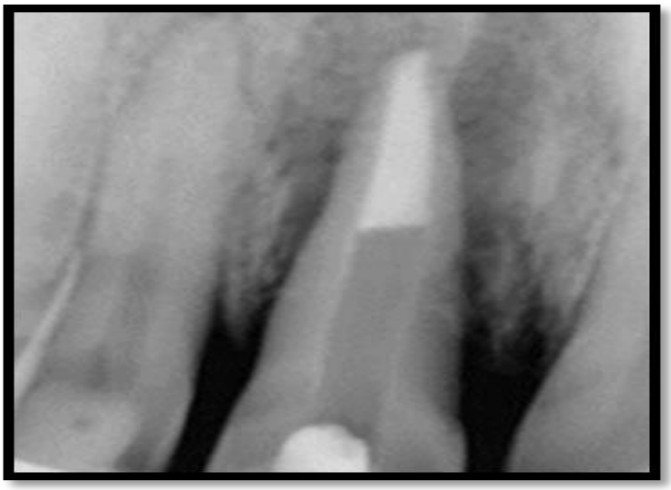

Figure 2: Placement of biodentin

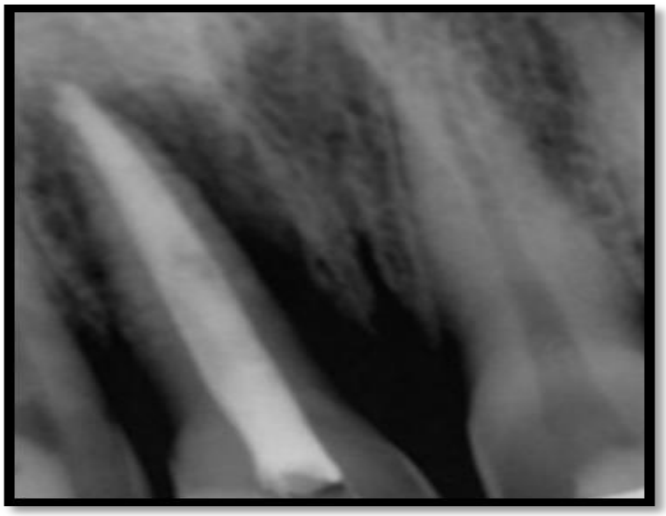

Figure 3: Obturation with obtura pellets

Figure 4: 9 months follow up

Discussion

Apexification is defined as a method to induce a calcified barrier in a root with an open apex or the continued apical development of an incomplete root in teeth with necrotic pulp (American Association of Endodontics 2003. Since the apex is open, there is a chance of the passage of bacteria and is by products from the root canal to the periapical tissues. So, in order to prevent this it is important to achieve a barrier or an apical seal at the apex.[2]

Previous studies have showed that calcium hydroxide have several disadvantages like failure of infection control, their root walls leading to fracture.

Apexification with MTA provides an alternate treatment modality for apexification procedure but because of the long setting time of MTA, differently in handling characteristics, discoloration (grey MTA) allow washout resistance and high cost.[6] Now, a calcium based silicate material biodentine (septodontt) is been introduced that promotes dentin, have high compressive strength. Biodentine exhibits high push out bond strength that pevents the material to displace from the repair site, hence is best for perforation repair. Other than perforation repair, biodentin is used in derect and indirect pulp capping, pulpotomy, repair of internal and external resorption and retrograde root end filling material.[7]

Biodentine consists of powder in a capsule and liquid in a pipette. Powder consists of tricalcium silicate, dicalcium silicate, calcium carbonate and oxide, iron oxide and zirconium oxide. Liquid consists of calcium chloride, and hydrosoluble polymers. Powder is then mixed with 5 drops of liquid in a capsule and triturated for 30 seconds.[8] Apexification with biodentine significantly reruires less time thus this can lessen the time require fo the patients. After effective shaping and cleaning of the root canal, the apex is sealed with biodentine to favour regeneration. The tooth with thin roots are treated with biodentine because there is less risk of fracture as there is immediate placement of bounded core within the root canal. In the present case combination of triple antibiotic paste is used as intracanal medicament for 21 days to free the canal from infection and the wide apical foramen is sealed with biodentin to achieve apical seal.

Conclusion

The case report showed the novel approach of using Biodentin in one-visit apexification procedures with an open apex and periapical lesion. Although the efficacy of biodentine as a dentin substitute is yet to be clinically

proven for its therapeutic indications, it may be a promising materual for apexification.

References

1. Bhasker SN. Orban's oral histology and embryology. 11th ed. St. Louis: Mosby-Year Book; 1991. p. 382.
2. American Association of Endodontists: Glossary of endodontic terms.
3. Sheehy EC, Roberts GJ. Use of calcium hydroxide for apical barrier formation and healing in non-vital immature permanent teeth: a review. Br Dent J. 1997;183:241–246.
4. Felippe MC, Felippe WT, Marques MM, Antoniazzi JH. The effect of renewal of calcium hydroxide paste on the apexification and periapical healing of teeth with incomplete root formation. Int Endod J. 2005;38:436–442.
5. Torabinejad M, Chivian N. Clinical applications of mineral trioxide aggregate. J Endod. 1999;25:197–205.
6. Lemon RR. Nonsurgical repair of perforation defects. Internal matrix concept. Dent Clin North Am. 1992;36:439–457.
7. About I, Laurent P, Tecles O. Bioactivity of Biodentine™ a CA3SiO5-based Dentine Substitute. Oral session. IADR Congress July 2010, Barcelona, Spain.
8. Aggarwal V, Singla M, Miglani S, Kohli S. Comparative evaluation of push-out bond strength of ProRoot MTA, Biodentine, and MTA Plus in furcation perforation repair. J Conserv Dent 2013;16:462-5.