

APEXIFICATION WITH BIODENTINE – A CASE REPORT

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ABSTRACT:

Management of non vital teeth with open apices is a challenge to the dental practitioners. In this clinical scenario, it is difficult to maintain the obturating material confine within the root canal without encroaching into periapical area. These kinds of cases cannot be managed by conventional endodontic treatment, and treatment of such cases with calcium hydroxide may take longer time for apical closure. But with this new material called BIODENTINE (Septodont) same treatment can be done in single visit with predictable result. Hence this case report present the use of biodentine to form an apical plug in open apex followed by complete root canal obturation using thermoplasticized guttapercha.

KEY WORD: Biodentine, Apexification, Apical Plug, Open Apex.

INTRODUCTION: One of the aims of root canal treatment is to completely fill the canal in order to prevent reinfection. But in case of an incomplete root development or the absence of apical constriction it becomes difficult to achieve an three dimensional adaptation of obturating material within root canal system. Because of lack of apical constriction, an alternative to standard root canal treatment ie. Apexification or Root end closure has been advocated. Apexification can be defined as a method to induce a calcific barrier in the root with the opex apex of an immature, pulpless tooth.^{1,2}

Biodentine is new bioactive cement with dentin like mechanical properties, which can be use as a dentin substitute in crown and root. Its crown application include pulp protection, direct and indirect pulp capping, pulpotomy. Its root application include apexification, perforation repair, internal and external root resorption, root end filling material.⁹ It is an calcium silicate based cement. The main component of powder is Tricalcium silicate ($3\text{CaO} \cdot \text{SiO}_2$), Calcium carbonate (CaCO_3), Zirconium dioxide (ZrO_2).

The liquid is the solution of CaCl_2 with water reducing agent.

Compared with other Ca_3SiO_5 based cement like MTA, this material has 3 advantages: faster setting time of about 12 min, higher mechanical properties, and better handling characteristic.¹⁰

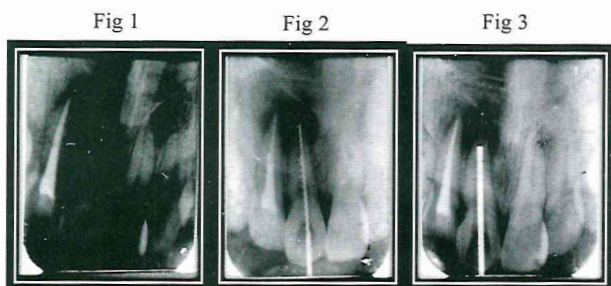
Thus the aim of this case report is to present the short term follow up result of an open apex with periapical lesion which was managed by using biodentine as an apical plug followed by obturation with thermo plasticized guttapercha.

CASE REPORT:

An 18 year old female patient reported to the department of conservative dentistry & endodontic of College of Dental Sciences, Davangere, Karnataka with the chief complaint of tooth discoloration of upper front teeth. Patient gave a history of trauma at the age of 9 year. On clinical examination 11 was seems to be discolored with Ellis Davis class I fracture.

Vitality test was then performed, 11 & 12 showed negative response to thermal & electrical pulp test. Radiographic examination revealed an immature tooth with wide open apex in relation to 11 and a radiolucent area in proximity of apex in relation to 11 & 12 (fig. 1). The treatment plan was decided to do apexification by using biodentine as an apical plug followed by obturation with thermoplasticized gutta-percha in 11 and conventional root canal treatment in 12.

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Access opening was done under rubber dam isolation and working length was determined (fig.2) gentle instrument was done with #80 H file in circumferential manner. Root canal debridement was done using alternative irrigation with 1% NaOCl & saline. Then canal was completely dried with multiple absorbent points & calcium hydroxide was placed in root canal and access was sealed with Cavit and patient recalled after 1 week. At subsequent appointment the Ca(OH) dressing was removed and saline irrigation was done. After drying canal, Biodentine (septodont) was manipulated by using amalgamator for 30 mins. Then biodentine was carried into canal by using amalgam carrier and subsequent increment were condensed with hand plugger till the thickness of 5 mm (fig.3&4) after then the root canal was backfilled with obtura II & post obturation radiograph was taken to confirm the completion of endodontic therapy(fig.5) and access was sealed with composite. A 2 – month follow up radiograph revealed decrease in the apical radiolucency.(fig.6), completely asymptomatic and has been called for further follow up.

DISCUSSION:

Apexification treatment is supposed to create an environment to permit deposition of cementum, bone and periodontal ligament to continue its function of root development. The goal of this treatment is to obtain an apical barrier to prevent the passage of toxins and bacteria into periapical tissues from root canal. Technically this barrier is necessary to allow compaction of root filling material.⁵

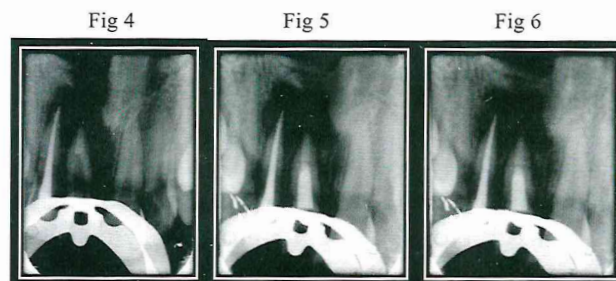
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Ca(OH)₂ has been the material of choice for induction of apical calcific barrier.

But long time required by Ca(OH)₂ to induce root end closure limits its use. But Ca(OH)₂ was used in this case because of its antimicrobial property.^{3,7}

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.



The endodontic indications of Biodentine are similar to the usual calcium silicate based materials, like the Portland cements. However, Biodentine has some features which are superior to MTA.⁴

- Biodentine consistency is better suited to the clinical use than MTA.
- Biodentine presentation ensures a better handling and safety than MTA.
- Biodentine does not require two step obturation as in case of MTA as the setting is faster there is lower risk of bacterial contamination than MTA.
- Biodentine may have more prominent biomineralisation ability than MTA.⁸

In the present case report, instrumentation was done with 80 H file circumferentially to effectively clean the canal without applying pressure to prevent fracture of thin dentinal wall. Water- based calcium hydroxide was placed to ensure rapid & complete disinfection. NaOCl is known to be toxic, especially in high concentrations. When rinsing immature teeth with open apices, there is an increased risk of pushing the irrigant beyond the apical foramen. Therefore, it is advisable to use less concentrated NaOCl, which is less toxic.⁶

apical calcific barrier.

CONCLUSION:

Single visit apexification with a novel biocompatible material ie. Biodentine, is a new boon in effective management of teeth with open apex, unlike MTA it has better handling property and its setting time is faster and has a improved mechanical property .This innovative procedure is predictable and less time consuming.

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