ORIGINAL RESEARCH PAPER

Volume-7 | Issue-1 | January-2018 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

# MANAGEMENT OF TEETH WITH OPEN APICES USING MTA AS ORTHOGRADE AND RETROGRADE FILLING MATERIAL

Dental Science

**Dr. Namita Mishra*** Senior Resident, Department of Conservative Dentistry & Endodontics, King George's Medical University, Lucknow, India *Corresponding Author

**Dr. Shiwani Garg** Senior Lecturer, Department of Conservative Dentistry & Endodontics, Desh Bhagat Dental College and Hospital, Punjab, India

**Dr. Akriti Goel** Senior Resident, Department of Conservative Dentistry & Endodontics, King George's Medical University, Lucknow, India

**Dr. A. P. Tikku** Professor & HOD, Department of Conservative Dentistry & Endodontics, King George's Medical University, Lucknow, India

**Dr. Ramesh Bharti** Associate Professor, Department of Conservative Dentistry & Endodontics, King George's Medical University, Lucknow, India

## ABSTRACT

The ultimate goal in the practice of endodontics is to debride and obturate the canal as efficiently and three dimensionally as possible in order to prevent re-infection. But some teeth with incompletely formed apex differ from providing routine treatment. Major challenges associated with endodontic treatment of immature teeth with necrotic pulp and wide open apices are achieving complete debridement, canal disinfection and most important optimal sealing of the root canal system. So, a procedure called apexification introduced to induce a calcified barrier in a root with an open apex but having thin dentinal walls. The aim of the procedure is to limit bacterial infection and create an environment conducive to the production of mineralized tissue in the apical region. Many materials like calcium hydroxide and mineral trioxide aggregate (MTA) have been reported to successfully stimulate apexification.

## KEYWORDS

Apexification, open apex, Calcium hydroxide, MTA, Retrograde.

## INTRODUCTION

Ultimate goal of endodontics is to debride and obturate the canal three dimensionally as possible in order to prevent re-infection. But this goal is very challenging for teeth with incompletely formed root apex.[1] In the past, the initial aim of the therapy known as apexification, was to create an environment conducive to the production of mineralized tissue in the apical that limits bacterial infection.[2] Many materials have been reported.

Calcium hydroxide was the first material of choice.[3] But lengthy course of 5 to 20 months of this treatment and high patient compliance presents challenges, including the vulnerability of temporary coronal restoration to reinfection, For these reasons, one visit apexification has been suggested.[2]

Mineral trioxide aggregate (MTA) has been proposed as a material suitable for one visit apexification as it combines biocompatibility and bacteriostatic action with favorable sealing ability which stimulates cell growth, adhesion and proliferation.[4]

In this paper, two clinical cases, which had premature interruption of radicular development caused by a previous trauma resulting in clinical and radiographic signs of pulp necrosis and apical periodontitis, are presented.

## CASE REPORT 1

A 18 year old patient came to Department of Conservative Dentistry and Endodontics with a chief complaint of pain and discoloration of maxillary left central incisor (21). Patient gave history of pain which was dull, gnawing in nature and aggrevates on mastication. The tooth had suffered a traumatic injury 10-11 years back.

Clinical examination showed discoloration in relation to tooth 21. Tooth showed tenderness on percussion but no response to vitality tests. Radiographic examination revealed faulty root canal treatment was already done and gutta percha was extruding out of apex.

First, access opening was prepared under rubber dam isolation and gutta percha was removed. Then, radiograph was taken which showed large blunderbuss canal with an open apex. Canal length is estimated radiographically. Preparation of the canal is performed very lightly and with copious irrigation using 0.5% sodium hypochlorite passively in the canal followed by rinsing with saline. Root canal was dried with paper points and calcium hydroxide dressing was placed for 1 week. After 1 week, dressing was removed by irrigating the canal with saline. Then canal was dried and MTA was placed with amalgam carrier in the pulp chamber and subsequent increments were condensed with hand pluggers to form 2-5mm of apical plug. A wet cotton pellet was placed and access cavity sealed with temporary cement. In subsequent appointment, root canal was obturated with tailor made gutta percha. Access cavity was sealed with composite. Patient is on regular follow-up.

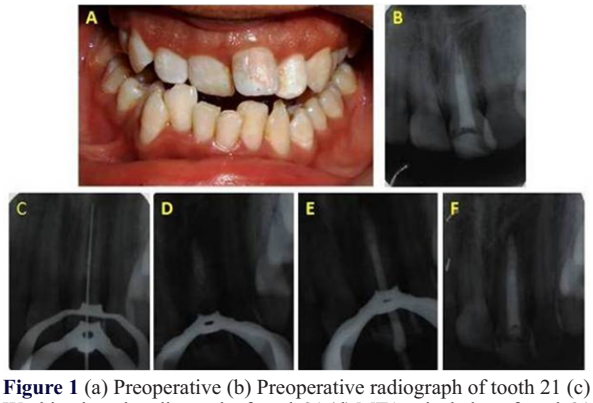


**Figure 1** (a) Preoperative (b) Preoperative radiograph of tooth 21 (c) Working length radiograph of tooth 21 (d) MTA apical plug of tooth 21 (e) Tailor made gutta percha of tooth 21 (f) Post-obturation radiograph.

## CASE REPORT 2

A 19 year old patient came with a chief complaint of broken and discolored maxillary left central incisor (21) and pain while biting.

At 9 years of age, she suffered trauma to this area. The tooth was asymptomatic. Clinical examination revealed fracture and discoloration in relation to tooth 21.Tooth showed tenderness on percussion but no response to vitality tests. Radiographic examination revealed a large blunderbuss canal with an open apex and there was periapical radiolucency. Root canal treatment followed by apical surgery was planned.

First, access opening was prepared under rubber dam isolation. Canal length is estimated radiographically. Preparation of the canal is performed very lightly and with copious irrigation using 0.5% sodium hypochlorite passively in the canal followed by rinsing with saline. Root canal was dried with paper points and calcium hydroxide dressing was placed for 1 week. At subsequent appointment after 10 days, dressing was removed and canal was then dried and obturated with tailor made gutta percha. Access cavity was sealed with composite Then, flap was raised and curettage was done. Then, MTA was used as retrograde filling material to seal the root apex. Then, sutures were given. Patient was recalled for follow-up for 6-months, 12-months.

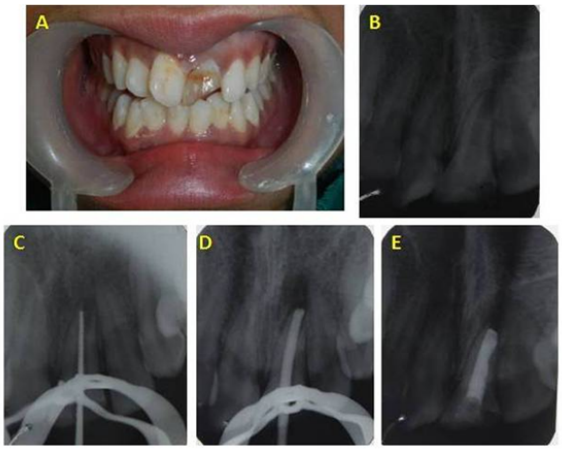


**Figure 2** (a) Preoperative (b) Preoperative radiograph of tooth 21 (c) Working length radiograph of tooth 21 (d) Tailor made gutta percha of tooth 21 (e) Post-obturation radiograph.

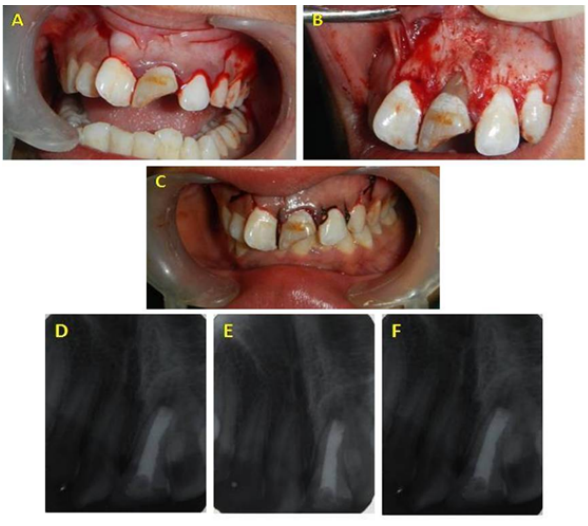


**Figure 3** (a) Incision given (b) Flap raised (c) MTA placed and sutures given (d) Post-operative radiograph (e) 6-months follow up (f) 12-months follow up

## DISCUSSION:

As instruments cannot be used properly in teeth with open apices, cleaning and disinfection of the root canal system rely on the chemical action of NaOCl as an irrigant and calcium hydroxide as an intracanal dressing.For obturation, we need an apical barrier. It is achieved by apexification treatment, thus preventing the passage of toxins and bacteria into periapical tissues from root canal. Technically this barrier is necessary to allow compaction of root filling material.[2]

Ca(OH)2 creates an environment conducive to the formation of an apical barrier formed by osteo-cementum tissue at the end of the root canal in teeth with open apices.[2] But previous studies have described its several disadvantages such as failure to control infection, recurrence of infection, cervical fracture, long period procedure and patient compliance.[5]It may weeken the dentin of roots and make them even more susceptible to fracture.[6]

MTA has been widely recommended for plugging open apices.[7] It represents a primary monoblock in attempts to strengthen immature tooth roots. Although it does not bond to dentin, interaction of the released calcium and hydroxyl ions of MTA with a phosphate-containing synthetic body fluid results in the formation of apatite-like interfacial deposits which fill up any gaps induced during the material shrinkage phase and improves the frictional resistance of MTA to the root canal walls.[8] These apatite deposits also accounts for the seal of MTA in orthograde obturations. MTA has superior biocomaptibilty and it is less cytotoxic due to its alkaline pH and presence of calcium and phosphate ions in its formulation results in capacity to attract blastic cells and promote favorable environment for cementum deposition.[9] One study suggested that a 5 mm apical barrier of gray MTA, using two-steps, provided the best apical barrier.[7]

The clinical cases reported here demonstrate that when MTA is used as an apical plug wheather orthograde or retrograde in necrotic teeth with immature apices, the canal can be effectively sealed.[10,11]

Both clinical and radiography follow-ups in the reported these cases showed healing and new hard tissue formation in the apical area of affected teeth.

## CONCLUSION:

Considering the time factor and the predictability of a three dimensional seal, MTA proves to be a better option for managing patients with open apices. But MTA is expensive that makes it unaffordable for a number of patients.Thus, selecting the correct technique and its proper implementation helps an endodontist to successfully overcome the so-called *"dilemma of open apex!"*

## REFERENCES:

1. Buch A. MANAGEMENT OF OPEN APEX :TREATMENT STRATEGIES REVISITED! Journal of Dental Sciences 2(1):24-26.
2. Patil SA, Patil AA & Dodwad PK. Management of non-vital teeth with open apices using MTA as an apical plug: two case reports. World journal of Dentistry 2011;2(1):45-48.
3. Giuliani V, Baccetti T, Pace R & Pagavino G.The use of MTA in teeth with necrotic pulps and open apices. DentTraumatol 2002;18:217-221.
4. Beena.S , Chandrashekar.L .Traditional Method of Management of an Open Apex in Maxillary Central Incisor. Journal of Dental Sciences and Research 2(2): 43-45.
5. Kubasad GC & Ghivari SB. APEXIFICATION WITH APICAL PLUG OF MTA-REPORT OF CASES. AOSR 2011;1(2):104-107.
6. Andreasen JO, Farik B, Munksgaard EC. Long term calcium hydroxide as a root canal dressing may increase risk of root fracture. Dent Traumatol 2002;18:134.
7. Tay1FR. & Pashley DH. Monoblocks in root canals - a hypothetical or a tangible goal. J Endod. 2007; 33(4): 391–398.
8. Bargholz C. Perforation repair with mineral trioxide aggregate: A modified matrix concept. Int Endod J. 2005;38:59–69.
9. Coviello J, Brilliant JD. A preliminary clinical study on the use of tricalciumphosphate as an apical barrier. J Endod. 1979;5:6–13.
10. Torabinejad M, Chiavian N. Clinical application of mineral trioxide aggregate. Journal of Endodontics 1993;25:197-205. 8. Shabahang S, Torabinejad M. Treatment of teeth with open apices using mineral trioxide aggregate. Practical Periodontics and Aesthetic Dentistry 2000;12:315-20.
11. Maroto M, Barberia E, Planells P, Vera V. Treatment of a non- vital immature incisor with mineral trioxide aggregate (MTA). Dental Traumatology 2003;19:217-21.