



NONSURGICAL ENDODONTIC MANAGEMENT OF IMMATURE NONVITAL TOOTH ASSOCIATED WITH LARGE PERIAPICAL LESION USING TRIPLE ANTIBIOTIC PASTE AND MTA APICAL PLUG: A CASE REPORT

Endodontics

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ABSTRACT

This article describes the nonsurgical management of immature nonvital tooth with periapical lesion using Triple Antibiotic Paste. An 18 years old male patient presented with periapical lesion in relation to the tooth #21 and #22. Tooth 21 was an immature tooth. Triple antibiotic paste was placed as an intracanal medicament for a period of 6 weeks, Mineral trioxide aggregate was then placed as an apical barrier to a thickness of about 4 mm. Obturation of the remainder of the canal space was done after 48 hrs. The favourable clinical and radiographic outcome in this case demonstrated that Triple Antibiotic Paste (TAP) may be an efficient alternative to disinfect the root canals in nonsurgical management of nonvital immature tooth.

KEYWORDS

Immature tooth; TAP; periapical lesion; nonsurgical; MTA

INTRODUCTION:

In situations where the pulp becomes necrotic before, the root fully developed, the apical opening is too large to create a stop for the root canal filling. (1) The infection of the root canal system is considered to be a polymicrobial infection, consisting of both aerobic and anaerobic bacteria. (2)

Aim of endodontic treatment is to eliminate as many bacteria as possible from the root canal system and create an environment in which no remaining microorganisms can survive. (3) Ideally, this can only be obtained through the use of a combination of aseptic treatment techniques, chemo-mechanical preparation of the root canal, antimicrobial irrigation, and intracanal medicaments and good apical seal. (2)

Most commonly used material for intracanal medicament is calcium hydroxide, but results of calcium hydroxide in large periapical lesion cases are unpredictable and its long term use can weaken the dentin and result in cervical root fracture on slight impact or even with normal use. (1,4) Currently, the common antibiotic-containing commercial pastes are Ledermix (Lederle Pharmaceuticals, Wolfratshausen, Germany) and Septomixine Forte (Septodont, Saint-Maur, France). (3) Both preparations have corticosteroids as anti-inflammatory agents. However, neither of these pastes can be considered suitable for use against endodontic microbiota owing to their inappropriate spectrum of activity. (3)

Recently, another combination of antibiotics, called 'triple antibiotic paste' (TAP) (ciprofloxacin, metronidazole, and minocycline) was introduced especially for the regeneration and revascularization protocol and the treatment of open apex teeth with necrotic pulp. This material has also shown other applications in endodontics. Initially, TAP was largely developed by Hoshino and colleagues, who investigated the effectiveness of the paste on the removal of microorganisms from the root canals. (2) The paste's applications vary, from vital pulp therapy to the recently introduced regeneration and revascularisation protocol. This case report demonstrated resolution of periapical lesion managed by nonsurgical approach using Triple Antibiotic Paste and MTA, observed over a period of 12 months.

CASE REPORT:

An 18 years old male patient visited to the department of Conservative Dentistry and Endodontics. For the past one year patient was experiencing recurrent swelling and discharge in labial region with respect to tooth #21 and #22. Patient's dental history revealed anterior trauma at 10 years of age. Preoperative radiograph revealed large radiolucency approximately 10mmX8mm with respect to tooth # 21 and #22. (Fig.1)

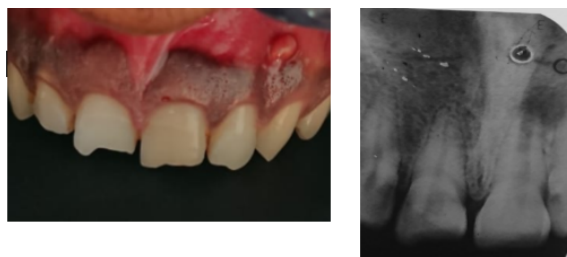


Figure 1, Preoperative photograph and preoperative radiograph

Tooth #21 showed large canal space and an open root apex. Provisional diagnosis was made chronic periapical abscess.

Under rubber dam isolation, access cavity was prepared. Working length was predetermined on preoperative radiograph and confirmed on radiograph with 80 no. K file. Canal walls were lightly instrumented with 80 no. H file under copious irrigation with 3% sodium hypochlorite.

The canals of tooth # 21 and 22 were dried. Triple Antibiotic Paste consisting of ciprofloxacin 500mg, metronidazole 400mg, and minocycline 100 mg in 1:1:1 proportion to a final concentration of 1.0 mg/mL was prepared in creamy consistency (Fig.2) and placed in the canals with the help of a lentulo spiral.



Figure 2: Metronidazole 400mg, Ciprofloxacin 500mg, Minocycline 100mg; TAP Paste mixed with Normal Saline.

The paste was restricted only till the canal orifice to minimize tooth discoloration. The paste was changed every 2 weeks for a period of 6 weeks until the teeth displayed no symptoms. Meanwhile, incisal edge built up was carried out with tooth #11 using composite resin. On subsequent visit, when patient was totally asymptomatic, and clinical signs and symptoms of inflammation were resolved, Triple Antibiotic Paste (TAP) was removed from canal with copious irrigation of 3% sodium hypochlorite. (Fig.3)



Figure 3: Armamentarium used.

Coronal discolouration with 21 and 22 was seen, maybe due to the minocycline present in the TAP. (Fig4)

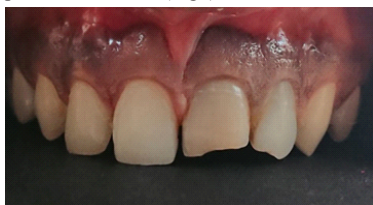


Figure :4 Pre-obturation clinical photograph



Figure 5: MTA Apical plug and immediate post obturation radiograph

Hand plugger was selected to fit 1.5 mm short of root apex. MTA (ProRoot, Maillefer, Dentsply, Switzerland) was mixed according to manufacturer's instructions and inserted into canal incrementally with (GDC) MTA Carrier.(Fig.3) Apical third of the canal was filled with MTA. 4 mm apical MTA plug was formed and it was confirmed radiographically .Moist cotton pellet placed over it and sealed with ZOE temporary cement.(Fig. 5)

After 48 hours, temporary dressing and cotton was removed from tooth #21 and remaining canal was obturated with thermoplasticized Gutta percha and Sealapex sealer. Tooth no. #22 was obturated with lateral compaction.(Fig.5)

One week after obturation, intracoronal bleaching was performed to correct the discoloration with tooth #21 & 22. After two weeks desired result was found. (Fig6)

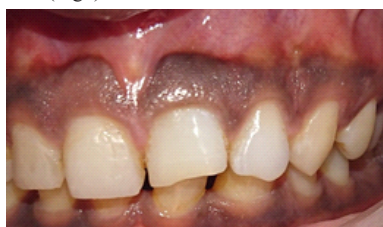


Figure 6:Post-bleaching photograph

Direct composite veneers done with tooth # 11, 21 and 22 (Fig7). Follow up radiographs of 6 months showed that the radiolucent area decreased in size and formation of trabecular bone and 1 year follow up radiograph showed that absence of radiolucent area and formation of trabecular bone. . (Fig 8) Clinical examination showed no sensitivity to percussion or palpation.

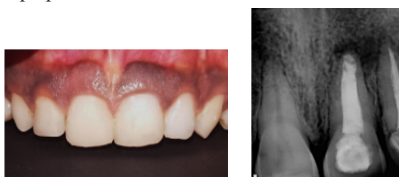


Figure 7: Direct composite veneer with 11, 21 & 22; Three months follow up radiograph

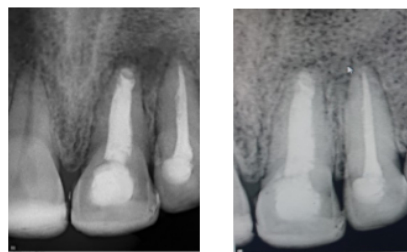


Figure 8: Six months and 1 year follow up radiographs

DISCUSSION:

Apexification is defined as a method of inducing a calcified apical barrier or continued apical development of an incompletely formed root in teeth with necrotic pulp (4). In apexification protocols, the placement of an apical plug is crucial for sealing and preventing bacterial leakage (5). In this case, for the management of the nonvital immature tooth with large periapical lesion ,nonsurgical therapy (Apexification with MTA)was preferred . MTA has been widely used for the apexification, because of its high pH, excellent sealing ability and ability to activate cementoblast and eventually cementum production. It also allows growth of the PDL. However, before the placement of the apical barrier disinfection of the canal with antimicrobial intracanal medicament is very important step in nonsurgical management of periapical lesion (5).

Although the systemic antibiotics are effective as an adjunct in many surgical and nonsurgical endodontic treatments, local application of antibiotics is always preferred in cases of nonvital teeth.(6,7). Because distribution of the drug is totally depending on the blood supply of the infected site. It's not possible in the teeth with necrotic pulps (7).

Numerous combinations of the antibiotics have been tested as an intracanal medicament in various studies. Polyantibiotic paste can cover the large spectrum of the microbial flora and also less likely to produce resistant bacterial strains, especially the combination of ciprofloxacin, metronidazole and minocycline has a diverse action against the microbial flora found in necrotic teeth (2).

This TAP was proved to be biocompatible. Tetracycline inhibits collagenases and matrix metalloproteinases, is not cytotoxic, and increases the level of interleukin-10, an anti-inflammatory cytokine. In addition, metronidazole and ciprofloxacin can generate fibroblasts (9). Metronidazole has a wide bactericidal spectrum against anaerobes while ciprofloxacin and minocycline are effective against bacteria resistant to metronidazole(10).

However, few drawbacks are there with the use of TAP. One is, severe reduction in micro-hardness of the root and demineralization of the dentine with 1 g/mL TAP , this detrimental effect can be reduced if 1 mg/mL methylcellulose-based TAP is used. Other literature has suggested that using lower concentrations will again minimize this problem (3). Other is, degree of crown discoloration, likely that related to the minocycline in the paste. Recently, the Minocycline-removed paste or DAP have found its place. It has been advocated, the use of calcium hydroxide so as to avoid discoloration. This cervical discoloration from the TAP can be removed by internal bleaching. Another approach is the application of dentine bonding agents or the use of composite resins as dentinal walls sealants. (2,3)

In this case, TAP was used to sterilise the canal, as it can affect gram-negative, gram-positive, and anaerobic bacteria, and this combination can be effective against odontogenic microorganisms. Mineral Trioxide Aggregate was used as an apical barrier, to achieve a stop and allows three dimensional obturation of the root canal. Triple Antibiotic Paste (TAP) with MTA showed the uneventful healing of the lesion.

Biodentin can be used as an alternative to MTA, as it has less setting time as compared to MTA.

CONCLUSION:

Triple Antibiotic Paste (TAP) can be effectively used for sterilization of canals and healing of periapical pathology. The favourable clinical and radiographic outcome in this case demonstrated that Triple Antibiotic Paste (TAP) may be an efficient alternative to disinfect the root canals in nonsurgical management of nonvital immature tooth.

Triple Antibiotic Paste (TAP), as an antibacterial intracanal medication, has diverse uses.

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