

CASE REPORT

SINGLE VISIT APEXIFICATION IN A REPLANTED TOOTH WITH COLLACOTE AND MTA- A CASE REPORT

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ABSTRACT:

Developing teeth with necrosed pulp and periapical pathologies are complicated to treat by conventional endodontic treatment. Conventionally, calcium hydroxide has been the material of choice for the apexification of developing permanent teeth but apexification with calcium hydroxide is seems to be associated with certain difficulties that include treatment time and tooth fracture. Apexification is a method by which artificial barrier in the root apex is formed in such a way that obturating material can be filled in the canal space. MTA has shown good sealing abilities and biocompatibility to the periradicular tissue. Single visit apexification using an apical plug of novel biocompatible material like mineral trioxide aggregate (MTA) has been indicated as an alternative to long-term intracanal use of calcium hydroxide in immature permanent teeth. This paper highlights the successful management of re-implanted teeth by single visit apexification using collacote and MTA.

Key words: Mineral Trioxide Aggregate (MTA), Collacote, Apical closure, Single visit Apexification.

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INTRODUCTION

The prime goal in endodontic therapy is the complete obturation of the root canal space to prevent re-infection. An undeveloped tooth that shows pulpal disease presents special problems. Since the apical foramen has not yet completely formed, conventional root canal treatment procedures would be unpredictable.^[1] In teeth with incomplete root development caused by trauma, caries and other pulpal pathosis, the absence of the natural constriction at the end of the root canal presents a challenge and makes control of filling materials difficult. Apexification therapy is initiated when clinical and radiographic evidence of pulpal necrosis has been unequivocally established and the incompletely formed root has an apical diameter greater than coronal diameter. Literature has well evidenced the use of custom gutta-percha cones however it is not advisable as the apical portion of the root is frequently wider than the coronal

portion.^[2] Laceration of the periapical tissues until bleeding occurred might produce new vital vascularised tissue in the canal. A single-visit apexification alternative to conventional apexification procedures has been proposed by Koeings et al.^[3] Three successful performance of a one-step procedure may benefit both the patient and the practitioner because of the reduced amount of office time required. The potential problem of patient compliance is also reduced, and it appears that reopening the root canal and recleaning during multiple visits may disturb the process of apexification.^[4-5] The objective of one-step apexification is to condense a biocompatible material into the apical end of the root to establish an apical stop. However, this procedure only fulfills one aspect of apexification, the creation of an apical stop. It does not allow for continued root development. Several materials—such as resorbable ceramics, calcium phosphate, freeze-dried demineralized bone, and

recently, mineral trioxide aggregates (MTA)—have been utilized in one-visit apexification.^[6-7]

MINERAL TRIOXIDE AGGREGATE [M.T.A] AND COLLACOTE

Mineral trioxide aggregate has been proposed as a potential material to create an apical plug. MTA is a powder that consists of fine hydrophilic particles that set in the presence of moisture. The major compounds of MTA are tricalcium silicate, tricalcium aluminate, tricalcium oxide and silicate oxide. Collacote was packed as a matrix, and MTA was condensed to form a barrier. Collacote is type1 bowine collagen & it is absorbed in 10–12 days. Collacote Provides an excellent matrix to assist in wound healing fully absorbable Establishes a matrix for tissue ingrowth Protects the oral wound bed. The remainders of the root canals were filled utilizing warm gutta percha technique and a resin bonded final restoration.^[8-9]

CASE REPORT WITH DISCUSSION

This case describes one-step apexification for an avulsed tooth resulted in pulpal necrosis before complete root development. A 11 yrs male reported to the Department of pedodontics & preventive dentistry having chief complain of mobile front teeth. He also gave history of avulsion of both central incisor due to impact on teeth. In this case a collagen barrier (CollaCote) was packed as a matrix, and MTA was condensed to form a barrier. The collacote was absorbed in 10–12 days. The remainders of the root canals were filled utilizing warm gutta percha technique and a resin bonded final restoration. Step by step procedure was as follows (Figure 1-3):

- 1) Chemico-mechanical debridement with 5.25% NaOCl solution followed by 17% EDTA.
- 2) Use gentle pressure to dry the canal with pre-measured sterile paper points to working length.
- 3) Selection of appropriate size plugger to working length (not too large to bind with canal walls and not too small to pierce the MTA).
- 4) Selection of the depth of the MTA plug using a Messing Gun that deposits a 4 mm MTA plug to working length.
- 5) Packing of the CollaCote using the pre-measured plugger to working length.
- 6) Mixing the MTA according to the manufacturer's instructions and load the pre-set Messing Gun.

- 7) Application of the 3 mm MTA plug to the orifice of the canal and gently tease the material apically until the stopper on the plugger is at the reference point.
- 8) Verification of the 3 mm apical plug radiographically.
- 9) Filling the remainder of the canal with gutta percha and resin bonded restoration.



Figure 1: Preoperative Extraoral view



Figure 2: Preoperative Intraoral view



Figure 3: Intraoral periapical radiograph showing the lesion

The success of the case could be attributed to several factors, such as magnification (being able to visualize and control the placement of CollaCote and MTA in the apical, most critical part of the canal). Other contributing factors are cleansing and shaping of the canals; superior biocompatibility, antimicrobial and sealing ability of MTA as documented in several studies. Obtaining an early final coronal seal compared to temporized teeth in the multiple visit (6–12 months) procedures is another important factor (Figure 4-6).



Figure 4: Splinting was done and it was removed after 8 weeks

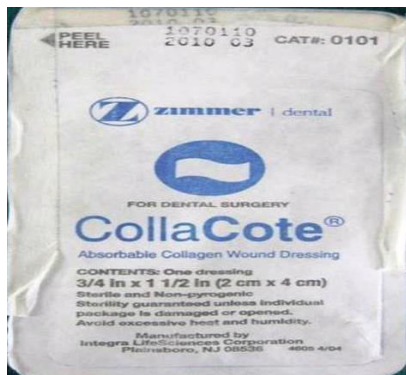


Figure 5: 'CollaCote'; Type1 bowine collagen



Figure 6: Postoperative Intraoral view

Combination of the previous factors may play a major role in increasing the success rate of necrotic teeth with immature apices. Following obturation with gutta-percha, restoration of the immature teeth must be designed to attempt to strengthen the immature teeth. Clear plastic posts such as the Luminex System® have been developed to allow light transmission throughout the canal, curing the entire mass of composite resin and possibly strengthening the root. Thus there is increasing popularity with one visit apexification techniques. One visit Apexification has been defined as the non surgical condensation of a biocompatible material into the apical end of root canal. The rationale is to establish an apical stop that would enable the root canal to be filled immediately.^[10] Torneck and others have indicated that when apical closure takes place clinically with $\text{Ca}(\text{OH})_2$, there is not complete bridging of the apex histologically. A resorbable-tricalcium phosphate ceramic has been developed.^[11] Koenig's, Brilliant and Driskell found that use of this material induced apical closure in vital teeth of primates with open apices.^[3,12-13] Regeneration of periodontal ligament occurred around the apices of teeth and it was associated with minimal inflammatory response. Some authors documented the long term success of using a tri-calcium phosphate plug as an apical barrier for one step apexification.^[14] Although highly successful, apexification should be the treatment of last resort in a tooth with an incompletely formed root. Attention should be focused on the maintenance of pulp vitality in these teeth so that as much root length and dentin formation as possible can occur. To evaluate one-step apexification further, a standardized method or model must be developed to compare the various materials being advocated.

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