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## RESEARCH ARTICLE

# ONE YEAR FOLLOW UP OF NON SURGICAL RETREATMENT WITH MTA APEXIFICATION- A CASE REPORT

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**ABSTRACT**

Sucessful root canal treatment involves in the complete understanding of the root canal anatomy and the microorganisms involved in the disease processes. The complex anatomy of the blunderbuss canals render the clinician a major challenge during obturation. Inadequately filled root canals are the major cause of failure, achieving an adequate biological seal in such cases is very essential for the success of the root canal treatment. The aim of this case report was to describe the technique of managing a failed blunderbuss canal with MTA apexification and hence achieve a biological seal.



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## INTRODUCTION

The success rate of root canal treatment has been reported to be 90-95% (Sjogren *et al*., 1990; Kerekes and Tronstad, 1979). The reasons of failure in endodontically treated teeth can be attributed to numerous causes which occur right from the diagnosis, during and after the treatment. Also failures can occur from both microbial and non microbial causes. Hence, failure in endodontic treatment is attributable to inadequacies in shaping, cleaning and obturation, iatrogenic events, or re-infection of the root canal system when the coronal seal is lost after completion of root canal treatment (West, 1975; Torabinejad *et al*., 1990; Alves *et al*., 1998; Southard, 1999). All these would eventually lead to microleakge and bacterial contamination (Ruddle, 1997; Ruddle, 1991) and studies have shown that microorganisms have been isolated in 35% to 100% of failed cases. (Annete Carola Anderson *et al*., 2012) Nair *et al*. (1990) and Lin *et al*. (1992) suggested that the major factors associated with endodontic failure are the persistence of microbial infection in the root canal system and/or the periradicular area. So it is mandatory that the clinician should have adequate knowledge about the root canal and technical aspects for the successful management of the endodontically compromised tooth. The quality of root canal filling influences the prognosis of endodontic treatment and also affect the periapical health and healing. Previous research has proved a direct relationship between low quality of root canal filling and periapical changes. These studies reported high prevalence of periapical lesions in endodontically treated teeth with inadequate root canal fillings (Kirkevang *et al*., 2000; Dugas *et al*., 2003). In another study, which assessed the outcome of endodontic treatment, the failure rate were found to be 33.3% in underfilled and 17.7% in unfilled root canals. (The factors responsible for endodontic treatment failure in the permanent dentitions of the patients reported to the college of dentistry, 2016) Chugal and colleagues have reported that if there is a loss of 1 mm in working length, the chance of endodontic treatment failure would be increased by 14% in the teeth with pre-existing apical periodontitis. (Chugal *et al*., 2001) When a young permanent tooth suffers a trauma, before root completion, it results in blunderbuss canal. In such cases, the absence of a natural constriction at the end of the root canal makes control of filling materials difficult. Because of the lack of an apical constriction, an alternative to standard root canal treatment, apexification or root-end-closure, has been advocated (Seltzer, 1988). Apexification can be defined as a 'method to induce a calcific barrier in a root with an open apex or the continued apical development of teeth with incomplete roots and a necrotic pulp' (American Association of Endodontists, 2003). Calcium hydroxide has been the first choice material for apexification (Rafter, 2005). It required a course of 5–20 months to induce the formation of a calcific

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barrier. Later, one visit apexification was suggested by Morse *et al*. (1990). MTA has been proposed as the material of choice for one visit apexification. MTA has been widely used in apexification procedures, as it offers good sealing, excellent marginal adaptation with good biocompatibility and superior strength of apical barrier when compared to calcium hydroxide. The aim of this case report is to present a short term clinical follow up of root canal treated blunderbuss canal.

**Figure 1. Preoperative radiograph**

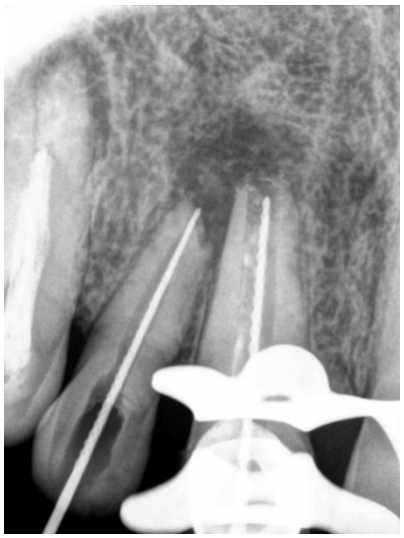

**Figure 2. Working length determination after GP retrieval**

**Figure 3. Orthograde placement of MTA**

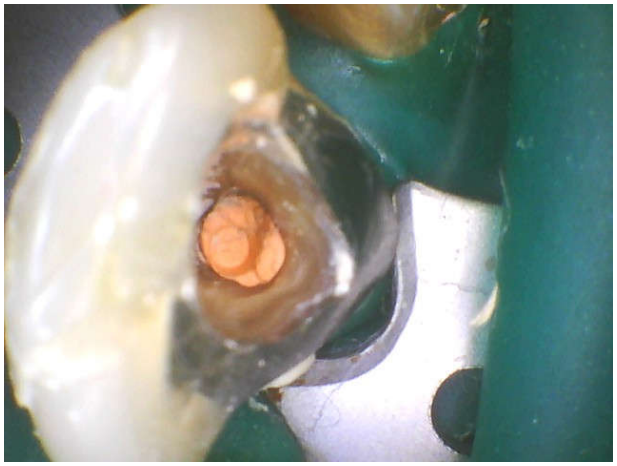

**Figure 4. Post obturation photograph**

**Figure 5. Post obturation radiograph**

**Figure 6. One year followup radiograph**

**Case report**

A 42 year old male patient came with the complaint of pain in upper front tooth region for the past one week. Past dental history reveals that the tooth has been root canal treated 12 years back. On clinical evaluation, there was a diffuse swelling along the labial sulcus of 11 and 21. The teeth were tender on percussion. Radiographic evaluation showed periapical lesion in relation to 11 and 12 (Figure 1). Obturation was inadequate in both the teeth. It was diagnosed as secondary endodontic infection in 11 and 12. The treatment plan was non – surgical retreatment in 11 and 12 with MTA apexification in 11. The teeth were isolated under rubber dam. Access cavities were redefined and the gutta percha was removed using Protaper retreatment files without using solvent. Working length was established. 11 had thin fragile walls and a blunderbuss canal (Figure 2). Circumferential filing was done both in 11 and 12. Cleaning and shaping was done and orthograde MTA plug was placed to a thickness of about 5 mm (Figure 3). The next day the patient was recalled and obturation was done by warm vertical condensation in 11 and lateral condensation in 12 (Figure 4, 5). There was a slight extrusion of sealer in 12. Metal ceramic crowns were given and patient was asymptomatic on one year follow up (Figure 6). The radiograph showed complete resolution of the lesion and adequate bone formation.

## DISCUSSION

Endodontic failures can be managed both non-surgically and surgically depending on the extent of damage to the tooth and the surrounding structures. Long term success of non – surgical retreatment have been reported to be higher than surgical retreatment. Success after retreatment is determined by clinical signs and symptoms, radiologic and histologic findings. Treatment of blunderbuss canals is a challenge to the clinician. Blunderbuss canals occur when the developing young permanent tooth suffers pulp necrosis, resulting in incomplete root formation. As a result of this the apical closure is not achieved leaving thin, fragile and wide dentin walls with large open apex. Apexification procedures should be carried out in teeth in order to mechanically strengthen the teeth from apical region. This procedure aims at providing a strong apical barrier to prevent the passage of bacteria and their toxins through the root canal to the periapical region. Initially calcium hydroxide was the material of choice for the apexification procedure. It induces the formation of hard tissue for the apexification procedure. It induces the formation of hard tissue barrier. Calcium hydroxide inhibits periradicular osteoclast activity and prevents granulation tissue from penetrating the root canal. Calcium hydroxide is highly effective in the formation of hard tissue barrier though there are certain shortcomings like unpredictable treatment outcome and question regarding the strength of the apical hard tissue formed. The mean time necessary for the formation of apical barrier is 12.19 months (Southward, 1999). Failure of formation of an apical barrier may be because of several factors: (i) repeated overfilling with calcium hydroxide which has a high pH (12.7) can induce a necrotic zone in the periapical bone; (ii) the lack of coronoradicular restoration and thus lacks an appropriate coronal seal while the canal system is not filled; (iii) a prolonged contact with calcium hydroxide induces a significant decrease in intrinsic properties of the exposed dentine. These last two factors are directly responsible for many root fractures occurring before the completion of the treatment (Rafter, 2005). The most promising alternative to calcium hydroxide is Mineral Trioxide Aggregate (MTA). It is non cytotoxic (Osorio *et al*., 1998). It has good biologic properties (Torabinejad *et al*., 1995) and when used in dogs' teeth with incomplete root formation and contaminated canals, it induced the formation of an apical barrier with hard tissue (Shabahang *et al*., 1999).

**There are many advantages of MTA:**

(i) reduction in treatment time,
(ii) possibility to restore the tooth with a minimal delay, and thus to prevent the fracture of the root and
(iii) it also avoids changes in the mechanical properties of dentine because of the prolonged use of calcium hydroxide.

In pulp capping procedures with MTA, the dentine bridge obtained has been found to be thicker, and its direct contact with the dentine walls ensured a better sealing than that obtained with calcium hydroxide. Felippe *et al*. showed that the bridge seems to be formed by bone and not dentine (Felippe *et al*., 2006). When MTA is used as a root-end filling it is claimed to form a bacterial-resistant barrier (Charland *et al*., 2013) that has been attributed to the presence of calcium hydroxide in the set materials (Koruyucu *et al*., 2015). In the present case report, MTA apexification has been found to improve the apical seal of the root canal and one year follow up has shown almost complete resolution of the periapical lesion. The radiograph also shows clearly that periapical tissues have healed considerably well with evidence of bone deposition. The antibacterial property of MTA could also have played a major role in combating the persistent infection.

**Conclusion**

Endodontic treatment failure could be successfully managed with nonsurgical endodontic retreatment. Recently, this has become possible with the availability of newer and more potent biomaterials. Hence the need for surgical retreatment should be considered only if nonsurgical methods fail.

## REFERENCES

Alves J, Walton R, Drake D. 1998. Coronal leakage: endotoxin penetration from mixed bacterial communities through obturated, post-prepared root canals. *J Endod*., 24(9):587-91

American Association of Endodontists, 2003. Glossary of Endodontic Terms, 7th edn.: American Association of Endodontists, Chicago.

Annete Carola Anderson, Elmar Hellwig, Robin Vespermann, Annete Wittmer, Michael Schmid, Lamprini Karygianni, Ali Al-Ahamed. 2012. Comprehensive analysis of secondary dental root canal infections; A combination of culture and culture independent approaches reveals new insights PLOS Nov 12.

Charland T, Hartwell GR, Hrischberg C and Patel R. 2013. An evaluation of setting time of mineral tri oxide aggregate and endosequence root repair material in the presence of human blood and minimal essential media, *J Endod*., 39,1071-1072.

Chugal NM, Clive JM, Spa ˚ngberg LSW. 2001. A prognostic model for assessment of the outcome of endodontic treatment: Effect of biologic and diagnostic variables. *Oral*

*Surg Oral Med Oral Pathol Oral Radiol Endod*., 91(3):342-52

Dominguez Reyes A, Munoz Munoz L, Aznar Martin T. 2005. Study of calcium hydroxide apexification in 26 young permanent incisors. *Dent Traumatol*., 21: 141–5.

Dugas NN, Lawrence HP, Teplitsky PE, Pharoah MJ, Friedman S. 2003. Periapical health and treatment quality assessment of root-filled teeth in two Canadian populations. *Int Endod J*., 36(3):18192. 9

Felippe WT, Felippe MC, Rocha MJ. 2006. The effect of mineral trioxide aggregate on the apexification and periapical healing of teeth with incomplete root formation. *Int Endod J.*, 39(1):2-9.

Kerekes K, Tronstad L. 1979. Long-term results of endodontic treatment performed with a standardized technique. *J Endod*., 5(3):83-90.

Kirkevang LL, Orstavik D, Horsted Bindslev P, Wenzel A. 2000. Periapical status and quality of root fillings and coronal restorations in a Danish population. *Int Endod J*., 33(6):509-15.

Koruyucu M. *et al*. 2015. An assessment of antibacterial activity for three pulp capping materials on enterococcus faecalis by direct contact test. An invitro study *Eur J Dent*., 9, 240-45.

Lin LM, Skribner JE, Gaengler P. 1992. Factors associated with endodontic treatment failures. *J Endod*., 18 :625–7

Morse DR, O'Larnic J, Yesilsoy C. 1990. Apexification: review of the literature. *Quintessence Int*., 21(7): 589–98.

Nair PNR, Sjögren U, Krey G, Kahnberg K-E, Sundqvist G. 1990. Intraradicular bacteria and fungi in root- lled, asymptomatic human teeth with therapy-resistant periapical lesions: a long-term light and electron microscopic follow-up study. *J Endod*., 16:580-8.

Osorio RM, Hefti A, Vertucci FJ, Shawley AL. 1998. Cytotoxicity of endodontic materials. *J Endod*., 24: 91–6.

Rafter M. 2005. Apexification: a review. *Dent Traumatol*., 21(1): 1–8.

Ruddle CJ. 1991. Surgical endodontic retreatment. *J Calif Dent Assoc*., 19(5):61-7

Ruddle CJ. 1997. Nonsurgical endodontic retreatment. *J Calif Dent Assoc*., 25(11):769-75, 777, 779-86 passim.

Seltzer S. 1988. Endodontology: Biologic Considerations in Endodontic Procedures, Lea & Febiger: Philadelphia, 2nd Edition, 17.

Shabahang S, Torabinejad M, Boyne PP, Abedi H, McMillan P. 1999. A comparative study of root-end induction using osteogenic protein-1, calcium hydroxide, and mineral trioxide aggregate in dogs. *J Endod*., 25:1–5.

Sjogren U, Hagglund B, Sundqvist G, Wing K. 1990. Factors affecting the long term results of endodontic treatment. *J Endod*., 16(10):498-504.

Southard DW. 1999. Immediate core buildup of endodontically treated teeth: the rest of the seal. *Pract Periodont Aesthet Dent*., 11(4): 519-26.

The factors responsible for endodontic treatment failure in the permanent dentitions of the patients reported to the college of dentistry, the University of Aljouf, Kingdom of Saudi Arabia. *J Clin Diagn Res*., 2016;10(5):ZC146-8

Torabinejad M, Hong CU, Pitt Ford TR, Kaiyawasam SP. 1995. Tissue reaction to implanted super-EBA and mineral trioxide aggregate in the mandible of guinea pigs: A preliminary report. *J Endod*., 21:569–71.

Torabinejad M, Ung B, Kettering JD. 1990. In vitro bacterial penetration of coronally unsealed endodontically treated teeth. *J Endod*., 16(12):566-9

West JD. 1975. The relation between the three-dimensional endodontic seal and endodontic failure. Master Thesis, Boston University.

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