

Endodontic Management of Maxillary Premolar Using Metapex And 2% Chlorhexidine As Intracanal Medicaments.

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Abstract

Repeated failures of Root canal treatment (RCT) teeth make us think for surgical management. This case report presents retreatment of a root canal treated case. Patient reported with history of undergoing root canal treatment twice earlier in which there was a persistent symptom after initial treatment. Initial pre operative Radiograph (RVG) revealed fixed partial denture in relation to 15, 16 and 17 and incomplete obturation with periapical abscess in relation to 15. The teeth were periodontally compromised, access through crown of 15 was planned, Initially Tungsten Carbide burs were used to gain coronal access through crown and post was retrieved through crown with the usage of ultra sonic tips and gutta-percha retrieved by chemo mechanical method. The periapical infection was non surgically managed with metapex and 2% chlorhexidine gel as intra canal medicament in combination for 4 weeks, with weekly change of medicament. With the combination of good aseptic technique and proper disinfection of root canals

non surgical retreatment offers positive results. This case report summarises the measures taken to gain access into tooth through crown, importance of combination of medicaments for retreatment.

Keywords maxillary premolar, chlorhexidine, metapex, retreatment

Introduction

Bacteria and their noxious products play a main role in the initiation and perpetuation of pulpo-periapical pathologies.[1] Studies show that approximately 50% of the teeth still harbor bacteria even after thorough shaping and cleaning.[2] Calcium hydroxide (CH) applied for a week shown to reduce the microorganisms to negligible.[4] Chlorhexidine (CHX) is shown to be effective in eliminating CH resistant microorganisms like *E. faecalis* inside dentinal tubules.[5] But it does not act as a physical barrier against microbes and has no detoxifying ability against endotoxins.[7] Despite conflicting claims, no medicament appears to be ideal and significant variability exists in clinical dental practice regarding their

use. So, a combination of the two medicaments has been used for a possible additive or synergistic effect.[8-11]

Case Report

A 55-year-old male patient reported with the chief complaint of spontaneous pain in right upper back region of jaw. Patient was apparently all right 1-month back, when he noticed pain in upper right back tooth region; Pain was dull which aggravated on biting from right side and relieved on relieving of biting pressure. Patient gave history of undergoing RCT two times earlier. Clinical examination revealed fixed partial denture in relation to 15,17 and 16 as pontic. Patient elicited no significant medical or family history. Tenderness on percussion 15. Pre-treatment radiograph revealed post and core and periapical abscess in relation to 15 (Fig 1). After clinical and radiographic evaluation endodontic retreatment was initiated. As 17 was periodontally compromised access was performed through crown of 15 without removal of FPD. Small sized tungsten carbide burs (SS White, Switzerland) and maintaining the hand piece in perpendicular direction to crown helped to maintain the shape of the access cavity in the centre of the crown of 15 to avoid perforation of crown. With the approach of the access cavity clinical examination was made to check for any bleeding areas for perforation and then the access cavity slightly extended with tapered fissure burs (Mani inc, Japan) to provide adequate convenience form. Retrieval of post was performed using Piezo electric Ultra Sonic tips (Woodpecker). Active distal end of ultra sonic tips is energized and moved circumferentially up and down along the exposed length of post for 5 min. Copious irrigation was performed during this procedure for deeper penetration of solvent and easy disruption of lute. When post was loosened, HedStorm(H)(Mani Inc, Japan) files engaged between post and root canal and post was

retrieved. After post retrieval apical gutta-percha was removed using chemo mechanical method (Fig 2).



Fig. 1: Pre operative radiograph showing post and core removal and periapical radiolucency in relation to 15

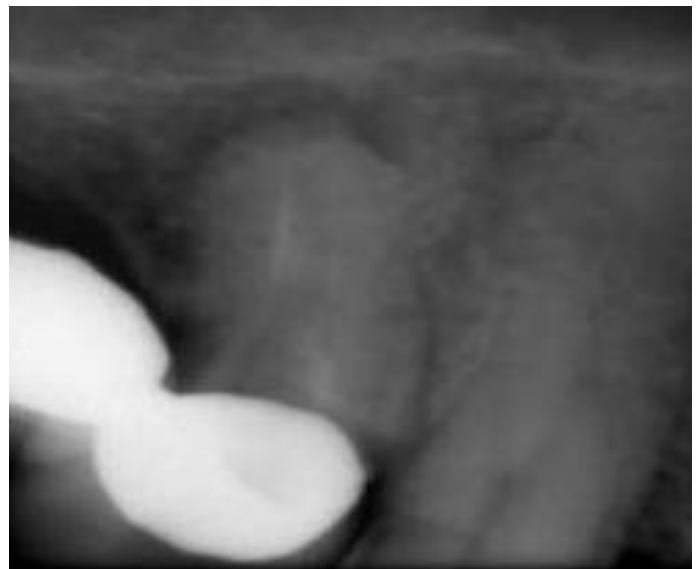


Fig. 2: Post retrieval and apical gutta-percha was using chemo mechanical method.

Canals were irrigated using 5.2% Naocl (Biodinamica). After the disinfection working length was determined using Root ZX II apex locator (J Morita Mfg, Japan). Chemomechanical preparation was done and canals enlarged till Prospers F3 (Dentsply). Metapex (Calciumhydroxide+Iodoform) (Metabiomed) + 2% Chlorhexidine gel (Essencial farma) – pH 12.8 (Fig 3) in

combination was used as intra canal medicament for 4 weeks with weekly change of medicament (Fig 4).



Fig. 3: Metapex and Chlorhexidine canal intra canal medicaments

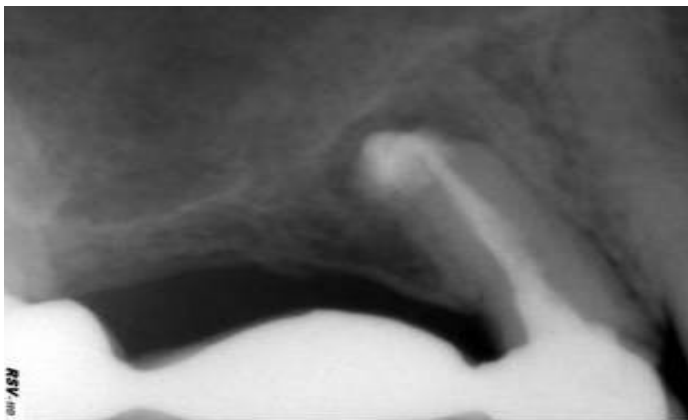


Fig. 4: Intra canal medicament inside root

Metapex and 2% chlorhexidine gel were dispensed onto glass slab. Both medicaments made into homogenous consistency. The medicament was loaded using amalgam carriers and down packed to the position using pluggers. After 4 weeks tooth was evaluated clinically and radiographically for intra canal bleeding, tenderness of hard and soft tissues which showed negative signs. Canals irrigated with 2% Chlorhexidine solution and finally obturated using warm vertical condensation (Fig 5). Patient remained asymptomatic and remained stable with no further treatment required.



Fig. 5: Obturation radiograph

Discussion

Bacteria and their toxins are primarily responsible for the initiation and persistence of pulpal and periradicular infections. Despite of proper preparation of root canal and irrigation procedures, elimination of bacteria by chemo mechanical preparation is transient.[1] Hence necessitates the use of intracanal medicaments for complete disinfection of root canal. Studies revealed that intra canal medication of calcium hydroxide for a week showed significant decrease in the microbial count.[2] Calcium hydroxide has following functions 1. Induces hard tissue formation 2. Acts as a physical barrier 3. Causes tissue dissolution 4. Interrupts nutritional supply to remaining bacteria 5. Has destructive effect on cell membranes and protein structures due to pH. In our case Metapex (Calcium hydroxide + Iodoform) is used in which Iodoform of the metapex makes calcium hydroxide radioopaque for its visualization in root canal. In pulpal necrosis and failed rct cases bacterial infiltration especially enterococcus faecalis into dentinal tubules is more, commonly seen in teeth with periapical lesions.[3] Though calcium hydroxide has an initial pH of 12, but initial pH is not maintained, in dentinal tubules because of dentine buffering capacity.[4] Enterococcus

Faecalis maintains homeostasis of cytoplasm due to presence of proton pump in cell membrane that helps in maintaining pH homeostasis.[5] Chlorhexidine was more effective in eliminating calcium hydroxide resistant microorganisms like *E. faecalis* inside dentinal tubules.[6] 2% Chlorhexidine Gel increases membrane permeability leading to leakage of low molecular weight ions like potassium ions and phosphorus ions at low concentration and precipitation of cytoplasmic contents at a higher concentration and has residual antimicrobial effect for upto 7 days. But it does not act as a physical barrier against microbial colonization and has no detoxifying ability against endotoxins.[7] Hence combined with calcium hydroxide to get synergistic effect of both the medicaments. The combination of Metapex+ 2% Chlorhexidine gel increases pH to 12.8, at which the bacteria cannot survive. Studies also revealed that Chlorhexidine added to Calcium hydroxide favoured greater effectiveness.[8-13] In our case access to the root was made through existing crowns. The risks associated with gaining access through crowns are reduced visibility and accessibility, increased risks of irreparable errors, increased risks of microbial infection if crown margins are poorly adapted. But in our case, crown had a good marginal integrity

Conclusion

Non-surgical treatment is best way to treat failed RCT teeth in first instance and teeth are permanently restored soon after the treatment to increase chances of success. By following necessary steps of preparation of access cavity of crown, access can be gained through crown in cases where removal of FPD is not feasible. Good aseptic technique, adequate chemo mechanical preparation combination of intra canal medicaments will optimize chances of eliminating *E faecalis*.

Even though chlorhexidine alone has potential against inhibiting *E faecalis* it must be remembered that calcium hydroxide has added benefit of physically obturating the canal for the duration of medication which prevents ingress of micro organisms and maintains dry canal till next visit. Certain endodontically failing teeth are not favourable to successful retreatment; in these instances various inter disciplinary treatment options like usage of ultrasonics are considered for success of the case.

References

1. Soares JA, Leonardo MR, Da Silva LA, et al. Elimination of intracanal infection in dog's teeth with induced periapical lesions after rotary instrumentation: Influence of different calcium hydroxide pastes. *J Appl Oral Sci* 2006;14:172-7.
2. Sjogren U, Figdor D, Spangberg L et al. The antimicrobial effect of calcium hydroxide as a short term intracanal dressing. *Int Endod J* 1991;24:119-25.
3. Love RM. *Enterococcus faecalis* a mechanism for its role in endodontic failure. *Int Endod J* 2001;34: 399-405.
4. Haapasalo HK, Sirén EK, Waltimo TM, et al. Inactivation of local root canal medicaments by dentine: an in vitro study. *Int Endod J* 2000;33(2):126-31.
5. Stuart CH, Schwartz SA, Beeson TJ, et al. *Enterococcus faecalis* its role in root canal treatment failure and current concepts in retreatment. *J Endod* 2006;32(2):93-8.
6. Siren EK, Haapasalo MP, Waltimo TM, et al. *In vitro* antibacterial effect of calcium hydroxide combined with chlorhexidine or iodine potassium iodide on *Enterococcus faecalis*. *Eur J Oral Sci* 2004;112:326-31.

7. Buck RA, Cai J, Eleazer PD et al . Detoxification of endotoxin by endodontic irrigants and calcium hydroxide. J Endod 2001;27:325-7.
8. Zancan RF, Vivan RR, Milanda Lopes MR, et al. Antimicrobial Activity and Physicochemical Properties of Calcium Hydroxide Pastes Used as Intracanal Medication. J Endod 2016;42(12):1822-182.
9. Podbielski A, Spahr A, Haller B, et al. Additive antimicrobial activity of calcium hydroxide and chlorhexidine on common endodontic bacterial pathogens. J Endod 2003;29:340–5.
10. Basrani B, Tjaderhane L, Santos JM, et al. Efficacy of chlorhexidine and calcium hydroxide containing medicaments against *Enterococcus faecalis* in vitro. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2003;96(5):618-24.
11. Gomes BP, Vianna ME, Sena NT, et al. *In vitro* evaluation of the antimicrobial activity of calcium hydroxide combined with chlorhexidine gel used as intracanal medicament. Oral Surg Oral Med Oral Pathol Endod 2006;102:544–50.
12. Nidhi Sinha, Santosh Patil, Preeti Kore Dodwad, et al. Evaluation of antimicrobial efficacy of calcium hydroxide paste, chlorhexidine gel, and a combination of both as intracanal medicament: An *in vivo* comparative study. J Conserv Dent 2013;16(1): 65–70.
13. Ertugrul Ercan, Mehmet Dalli, C Turksel Dulgergil, et al. Effect of Intracanal Medication with Calcium Hydroxide and 1% Chlorhexidine in Endodontic Retreatment Cases with Periapical Lesions: An In Vivo Study. J Formos Med Assoc 2007;106(3):217–224.