



ORIGINAL RESEARCH PAPER

Prosthodontics

EFFECTIVE MANAGEMENT OF PERIAPICAL LESION USING CALCIUM HYDROXIDE AS INTRA CANAL MEDICAMENT- CASE REPORTS

KEY WORDS:

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ABSTRACT

A tooth with an infected non-vital pulp is a reservoir of infection that is isolated from the patient's immune response and will eventually produce a peri-radicular inflammatory response. Cleaning, shaping, and irrigation greatly reduce the cultivable numbers of bacteria. Residual bacteria are most often located in inaccessible areas such as isthmuses, ramifications, deltas, accessory and lateral canals, and dentinal tubules. Antibacterial intracanal medicaments such as calcium hydroxide have been advocated to be used to supplement the disinfection protocol and to eliminate the remaining pathogenic microflora. This paper presents two cases which demonstrate the achievement of optimum treatment outcome as evidenced by reduction of periapical lesions after non-surgical root canal treatment of infected teeth using calcium hydroxide as inter-appointment dressing.

INTRODUCTION

Endodontic diseases are characterized as infectious diseases and microorganisms have been identified as the principal cause of pulpal and periradicular pathological processes. Progressive development of periradicular pathosis can be arrested by the elimination or reduction of microorganisms in the pulp space which will pave the way for healing¹. The use of antimicrobial intracanal medicaments has been advocated to supplement disinfection procedures and eliminate remaining pathogens after cleaning and shaping. The most popular intracanal medicament in use currently is calcium hydroxide²⁻³. The antibacterial effect of calcium hydroxide is attributed to its high alkaline pH⁴. Meticulous adherence to protocol in disinfection of root canals can lead to favourable treatment outcomes. This report focuses on some cases that demonstrate healing of periapical lesions associated with infected teeth by non-surgical endodontic therapy using calcium hydroxide as intracanal medicament.

CASE REPORTS

Case-1

A 20-yr old male patient with non-contributory medical and family history reported with a history of pain in the lower left quadrant. On clinical examination, fractured composite restoration was observed in tooth no, 36 with tenderness on percussion. Radiographic examination revealed diffuse periapical radiolucency around the mesial root (Fig 1a). Root canal treatment was performed in two visits under rubber dam isolation. In the first visit, access preparation was done and three canal orifices were located. Cleaning and shaping was performed with ProTaper Ni-Ti rotary files (Dentsply Maillefer, Ballaigues, Switzerland) under copious 2.5% sodium hypochlorite irrigation. Final flush with saline was done. Paper points were used to dry the canals. An interappointment dressing was placed with calcium hydroxide in glycerine vehicle which was delivered into the root canals using lentulo spirals. Tooth was temporized using Cavit (ESPE, Seefeld, Germany) for 2 weeks. In the second visit, the calcium hydroxide dressing was removed and obturation was done with gutta-percha cones by lateral condensation technique using AH Plus sealer (Dentsply/Maillefer; Tulsa, Okla.). Post endodontic restoration was done with composite resin. One year follow-up radiograph revealed markedly reduced periapical lesion (Fig 1e).



Fig 1(a-e): Pre-op, intra-op and post-op radiographs

Case-2

A 21-yr old female patient with reported with a chief complaint of broken and discolored upper front teeth. IOPA radiograph revealed a circumscribed periapical radiolucency in relation to tooth No 21 and root canal treated tooth No 11 (Fig 2a) Treatment was carried out with hand stainless steel files under rubber dam isolation with 2.5% NaOCl irrigation. Final flush with saline was done. Canals were dried with paper points. The intracanal medicament, Metapex was used for a period of 2 weeks. Metapex is a commercially available product composed of calcium hydroxide, silicone oil, and iodoform (Meta Dental Corp. Ltd., Elmburst, NY). Access was sealed using Cavit for 2 weeks. In the second visit, Metapex was removed, and the canals were obturated with gutta-percha cones by lateral condensation technique and AH Plus was used as sealer. Post endodontic restoration like post and core with PFM crown on tooth no 11 and PFM crown on 21 was done. Follow-up IOPA radiograph after 6 months revealed significant reduction in the lesion (Fig 2e).



Fig 2(a-e): Pre-op, intra-op and post-op radiographs

Discussion

One of the greatest challenges in endodontic therapy is disinfection of a complex root canal system and its ramifications to create a healthy environment for the tooth to achieve maximum healing. Sodium hypochlorite is considered to be of the highest standard for irrigation of root canals owing to its excellent antibacterial, tissue solvent, and lubricant properties.¹ Different concentrations of NaOCl i.e., 0.5%, 1.0%, 2.5%, and 5.25%, have been shown to be equally efficacious in the sterilization of necrotic root canals as well as removal of superficial debris². Therefore, 2.5% NaOCl was used as the main irrigant.

Cleaning, shaping, and irrigation greatly reduce the cultivable numbers of bacteria. However, it has been shown that it is impossible to achieve a sterile root canal system in all cases by cleaning and shaping alone (62% remaining positive), in agreement with the findings of Byström and Sundqvist³. Residual

bacteria reside in inaccessible areas such as isthmuses, ramifications, deltas, accessory and lateral canals, and dentinal tubules. If bacteria persist in the root canal system at the time of obturation, there is a higher risk of failure. Hence, attempts to eliminate remaining bacteria involve the use of an antibacterial intracanal medicament⁴. It is required to reduce the microbial flora to the lowest level possible to ensure a successful outcome. According to a meta-analysis calcium hydroxide has been designated as the best root canal medicament available⁵.

In general, three types of vehicles are used: aqueous, viscous or oily. Viscous vehicles are water-soluble substances that release Ca^{2+} and OH^- ions more slowly for extended periods. They provide lower solubility of the paste when compared with aqueous vehicles because of their high molecular weights. Viscous vehicles are glycerine, polyethyleneglycol and propylene glycol⁶. In this case series glycerine was used as the vehicle.

To maximize reduction of bacteria in the root canal before obturation, calcium hydroxide should be used as an interappointment dressing for a minimum of 7 days. Radiographic assessment has been used in numerous endodontic outcome studies, and it still serves as the common mode in daily clinical practice⁷. Therefore, this report has utilized radiographs to assess evidence of healing during follow-up visits of patients.

This case series demonstrates that adhering to a strict aseptic protocol and use of antibacterial strategies can provide satisfactory results for healing of infected teeth.

Conclusion

Calcium hydroxide used as intracanal medicament is an excellent means of disinfecting necrotic teeth with primary apical periodontitis which lead to optimum treatment outcome.

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