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# Non- Surgical Management of Periapical Lesion

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***Abstract:*** *With dawn of era of minimal intervention in dentistry, surgical management of periapical lesions become controversial. Non-surgical or conservative management of periapical lesions not only cause less trauma to the tissues, but also promote faster and less eventful healing. This paper presents successful management of a periapical lesion in a 14 year old male child with calcium hydroxide paste in an oily vehicle with successful resolution of signs and symptoms both clinically and radiographically.*

***Keywords:*** *Calcium hydroxide, non surgical, Periapical lesions.*

## I. Introduction

The main goal of endodontic therapy is to completely eradicate or achieve a significant decrease in microbial flora of root canal system and to return the involved teeth to a state of health and function. Chemo-mechanical instrumentation alone is not completely sufficient or capable to disinfect the root canal system.[1]

All inflammatory periapical lesions should be initially treated with conservative nonsurgical procedures. Surgical intervention is recommended only after nonsurgical techniques have failed. Surgical procedures have many drawbacks, which limit their use in the management of periapical lesions. Various studies have reported a success rate of up to 85% after endodontic treatment of teeth with periapical lesions. A high percentage of 94.4% of complete and partial healing of periapical lesions following nonsurgical endodontic therapy has also been reported[2]. Children specifically should be treated initially with nonsurgical approach, especially those causing least harm, both functionally and psychologically.

Non-surgical techniques procedures for managing periapical lesions include like Active nonsurgical decompression technique, Aspiration and irrigation technique, Decompression technique Conservative root canal treatment without adjunctive therapy Aspiration through the root canal technique Method using calcium hydroxide Apexum procedure, Lesion sterilization and repair therapy.[3]

Calcium hydroxide is used extensively as an intracanal medicament in endodontics for many years. It is used in various clinical situations such as to promote apexification, to repair perforation, to enhance healing of periapical lesions, to control root resorption, and to control exudation in teeth with persistent periapical inflammation. This paper presents a case report of non surgical management of a large periapical lesion in which $Ca(OH)_2$ was used as an intracanal medicament.

## II. Case Report

A male patient 14 years of age, reported to the department of Pediatric and Preventive Dentistry of our institution with the chief complaint of swelling and intermittent pain in relation to upper front teeth. A history of accident 2 years back involving trauma to tooth was recorded. There was slight bearable pain since one year and swelling since 2-3days which has been increasing progressively. On oral examination, it was found that 11 was fractured (Ellis Class II fracture) and a small swelling was seen on the labial aspect of gingiva approx. On radiographic examination, a large radiolucency in the periapical area was seen in relation to 11 on the lateral aspect. Pulp vitality showed the tooth 11 to be non-vital and 12 and 21 to be vital. Only 11 was found tender on percussion. Root canal treatment was decided in 11. Access opening was done and abscess drained through the root canal. After thorough irrigation, tooth was sealed with a temporary restoration. In the following visit, the working length estimation and a thorough chemo-mechanical preparation was done using Ni-Ti K files. The root canals were irrigated with combination of sodium hypochlorite and sterile saline solution. The canals were dried with sterile paper points. Later, Metapex, a silicone oil-based calcium hydroxide paste containing 38% iodoform was placed in the root canal and pushed periapically.

3 months follow up did not show any noticeable healing of periapical region. On pulp vitality testing 12 was found to be non-vital. Root canal treatment was initiated thereby and access opening, working length determination and a thorough chemo-mechanical preparation was done. 2 months follow up revealed initiation of periapical healing in the area. The intracanal dressing was renewed at quarterly intervals. Regular follow ups

at 3-, 6- and 12 months showed progressive healing of the lesion and complete resolution of lesion at the end of 14 months. Later the canals were re-entered, cleaned and final obturation done with gutta-percha.

## III. Discussion

The management of large periapical lesions is the subject of prolonged debate. The treatment options range from RCT or NSRCT with long-term $Ca(OH)_2$ therapy to various surgical interventions, including marsupialisation, decompression with a tube and surgical removal of the lesion. These treatment options can also be combined[4].

A thorough instrumentation along with copious irrigation are the foundation stones of a successful root canal treatment. Instrumentation and irrigation reduce bacterial presence, though an agent with bactericidal action is still needed to ensure optimum disinfection. Bhaskar[5] suggested that if instrumentation is exceeded 1 mm beyond the apex, the resulting inflammatory reaction destroys the cyst lining and transforms the lesion into granuloma. Further, as the casual factors are eliminated, granuloma heals spontaneously. Exceeding the apical zone with penetration into the radiotransparent area also contributes to healing by establishing drainage and affording pressure relief and further, with degeneration of the epithelial cells through strangulation, as a result of the proliferation of fibroblasts and collagen – exerting pressure upon the cyst wall capillary supply.[6] Contrarily, this can also cause increased epithelial proliferation and cyst expansion thereby hampering the healing process[7]. In this case we instrumentation was done 0.5-1mm short of apical foramen so as to avoid the additional trauma.

Irrigation with 5.25% sodium hypochlorite and adequate biomechanical preparation is recommended for effective neutralization and removal of infection from the root canal system, followed by calcium hydroxide intracanal medication[8]. All biological actions of calcium hydroxide progress by the ionic dissociation in calcium ion and hydroxyl ion. Antimicrobial activity of calcium hydroxide is related to release of hydroxyl ions in an aqueous environment. Hydroxyl ions are highly oxidant-free radicals that show extreme reactivity resulting in the damage to bacterial cytoplasmic membrane, protein denaturation, and damage to bacterial DNA[9].

In this the vehicle used as carrier for calcium hydroxide plays an important role. The velocity of ionic dissociation, causing the solubilisation of paste and resorption at various rates by the periapical tissues and from within the root canal is determined by Vehicle. In general three types of vehicles are used: aqueous, viscous, or oily. Higher the viscocity of vehicle, slower is the dissociation process. From a clinical standpoint, this means that root canal have to be re-entered less times until the desired effect is achieved, thereby decreasing the number of appointments. Viscous vehicles like glycerine, poly ethylene glycol, and propylene glycol, cause release $Ca^{2+}$ and $OH^{-}$ ions more slowly for extended periods. The lowest solubility and diffusion of paste within the tissues is promoted by oily vehicle (for example, olive oil, silicone oil, camphor, metacresylacetate, and some fatty acids) which means the medicament remains for extended periods in the root canal.[10]

Healing and repair of periradicular tissues is a complex process of regeneration involving bone, periodontal ligament, and cementum[3]. Radiological signs such as changes in lesion density, trabecular formation and the formation of lamina dura are indicative of healing, particularly when associated to asymptomatic teeth and healthy soft tissues. In cases involving perforation of the cortical plate, healing begins with the regeneration of the external cortical plate and proceeds from the outside of the lesion toward the inside.[11,12] Maxillary lesions resolve faster than mandibular lesions due to the presence of a more extensive vascular network in the maxilla, which facilitates resolution. Anterior lesions of both the maxilla and mandible heal at a faster rate than posterior lesions due to the close proximity of the buccal and lingual plates in the anterior segments.[3]

Complete healing of the lesion was observed in this case over a period of 17 months. Intracanal medicaments help in disinfecting bacteria contaminated canal. Calcium hydroxide, is a routinely used intracanal medicament and as an interappointment dressing for management of periapical lesions, non-surgically. This non-surgical approach helped in successful resolution of the lesion.

## IV. Conclusion

Complete periapical healing in relation to both the teeth was observed. Use of Calcium hydroxide paste was found to be judicious under thorough cleaning and disinfection procedures. However, complete healing can be assured only at a longer follow up period with no recurrence of pathologic signs and symptoms.

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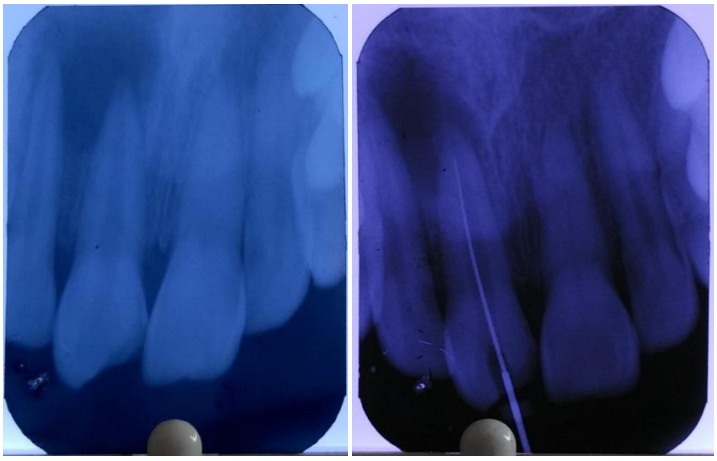
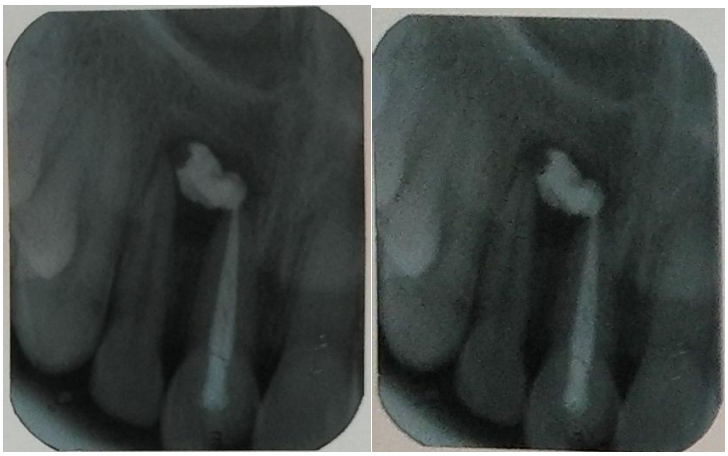
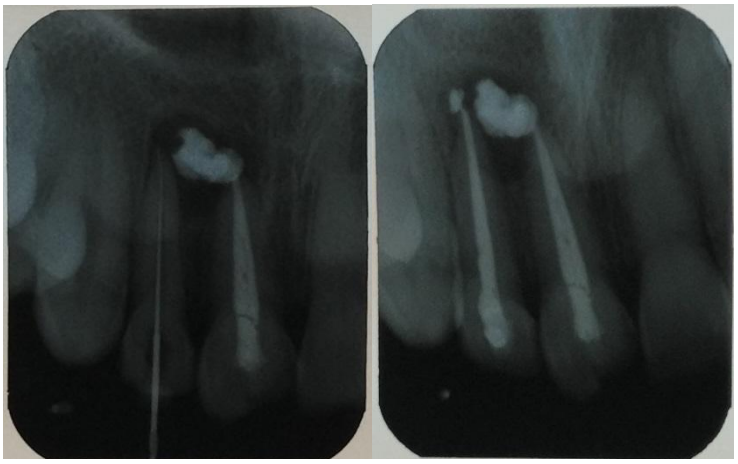
**Figures:**



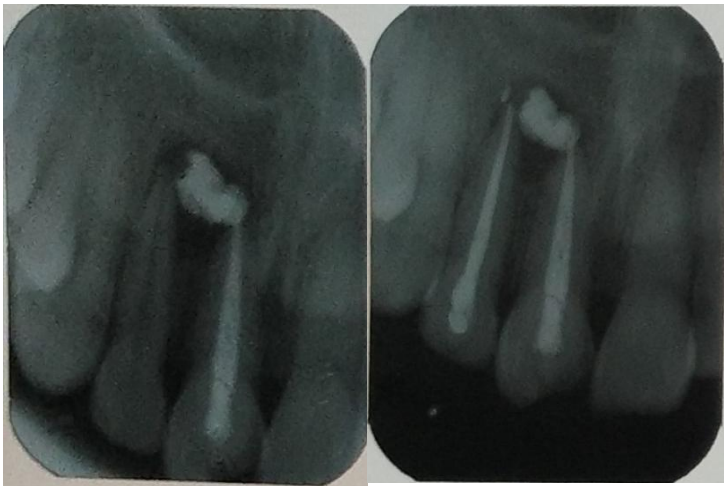
**Pre-op** **Working length determination**



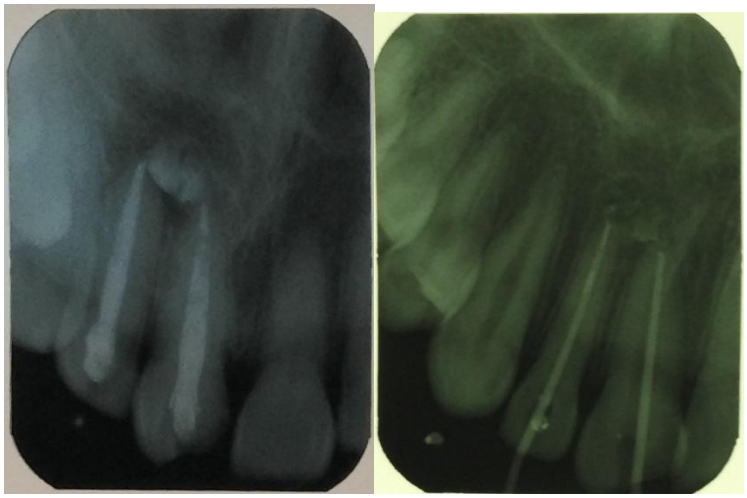
**Metapex placed in 11** **6months follow up**



**Working length determination in 12** **Metapex placed in 12**



**4 month follow up** **6 months follow-up**



**12 months follow-up.** **17 months follow up**

**Post obturation.**