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THE EFFECT OF ACCIDENTALLY EXTRUDED CALCIUM HYDROXIDE WITH IODOFORM PASTE INTO THE PERIRADICULAR LESION: A CASE REPORT.

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ABSTRACT: Introduction: Since its introduction in the dentistry calcium hydroxide (Ca(OH)2 has been used for a wide variety of purposes. Its use in root canal treatment as an intracanal medication has been associated with periradicular healing. **Aim:** To report a case of accidentally extruded Ca(OH)2 paste into the periradicular lesion associated withthe mandibular left central incisor and evaluate the prognosis of periradicular healing. **Methods:**The canal of mandibular left central incisor was prepared and Ca(OH)2 paste with Iodoform was used as an intracanal medicament. The medicament was accidently extruded into the periradicular tissues. Follow-up was done to determine the effect of extruded medicament on periradicular tissues and healing. **Conclusion:**The follow-up radiograph after 8 months showed complete resolution of the periapical lesion and resorption of the Ca(OH)2 paste.

KEYWORDS: Calcium hydroxide paste, Iodoform, periradicular lesion, accidental extrusion

INTRODUCTION

Since its introduction in the dentistry calcium hydroxide (Ca(OH)2) has been used for a wide variety of purposes including lining of cavities, indirect and direct pulp capping, dressing after pulpotomy, dressing of the root canal between appointments, repair of iatrogenic perforation, prevention of root resorption, treatment of horizontal root fractures and as a constituent of root canal sealers.[1] Its use in root canal treatment as an intracanal medication has been associated with periradicular healing.[2] This was promoted by a series of articles[3,4] documenting the antibacterial efficacy of Ca(OH)2in human root canals. Subsequent studies substantiated these reports[5,6] and the routine use of Ca(OH)2 as an inter-appointment intracanal medicament became widespread.

Ca(OH)2is an effective intracanal antibacterial dressing mainly as a result of its high pH and its destructive effect on bacterial cell walls and protein structures.[7]It has been demonstrated that treatment with Ca(OH)2 as an intracanal dressing in the presence of large and chronic periapical lesions can create an environment more favorable to healing and encourage osseous repair.[8] Ca(OH)2 is a thin granular powder with strong basic properties and density of 2.1. It slightly dissolves in water and is insoluble in alcohol. Ca(OH)2 mixed with any of the vehicles (aqueous, viscous or oily) lacks radiopacity and is not easily seen radiographically. This is the main reason that radiopaque materials (Barium Sulphate, Bismuth and other compounds containing iodine and bromine) are added to the paste, thereby helping in identifying the lateral and accessory canals, resorptive defects, fractures and other structures.[9,10]

The aim of this article is to report a case of accidentally extruded Ca(OH)2 paste into the periapical lesion associated with the mandibular left central incisor and evaluate the prognosis of periradicular healing.

Case report:

A 16 year old male reported to the Department of Conservative Dentistry and Endodontics, Government Dental College and Hospital, Hyderabad with pain and swelling in relation to the chin past one day. There was a history of trauma to the maxillary and mandibular anterior teeth 2 years back. On extra oral examination, a 3X2cm diffused swelling was present over the submental area which was tender on palpation and was fluctuant. The submandibular and submental lymph nodes were palpable, tender and mobile.

On intraoral examination, class I type fracture (Ellis & Davey) was observed in the maxillary right central incisor and class II type fracture (Ellis & Davey) in the mandibular left central incisor **(Fig.1).** The mandibular left central incisor had grade I mobility and tender on percussion. On electric pulp testing the mandibular left central incisor gave negative response whereas the maxillary right central incisor gave the positive response.

Fig.1.Pre-Operative view showing Class I type of fracture (Ellis & Davey) in maxillary right central incisor and Class II type of fracture (Ellis & Davey) in mandibular left central incisor.

The radiographic examination revealed a diffused radiolucency in relation to mandibular left central incisor and the root apex showed incomplete closure **(Fig.2A)**. The diagnosis was acute apical abscess in mandibular left central incisor due to pulpal necrosis as a sequel to trauma. The patient was advised to take antibiotics and analgesic and was reviewed after three days for endodontic treatment.

Endodontic treatment was initiated in mandibular left central incisor after local anesthesia (Lignox2%, Indico Remidies, Warren, Goa)under rubberdam isolation. On access opening, there was purulent pus discharge along with blood into the pulp chamber. The root canal was cleaned and shaped with K-files (Mani, Prime Dental, Mumbai) using step back technique up to the size 40 after the discharge was controlled. The canals wereirrigated with 5ml 3% sodium hypochlorite (Vishal Dentocare Pvt. Ltd, Ahmedabad, Gujarat) between each file and final rinse was done with 5ml saline. An inter-appointment dressing with Ca(OH)2powder (Vishal Dentocare Pvt. Ltd, Ahmedabad, Gujarat)mixed with saline was given and access cavity was sealed with Cavit G (3M ESPE, Seefeld, Germany).

In the second appointment after 5 days the pain and swelling resolved. The root canal was checked for any exudation with absorbent points. The exudation was seen in the apical third. In this appointment, Ca(OH)2 with Iodoform paste (Metapex, Meta Biomed, Korea) was injected into the root canal and caution was taken to confine it into the canal, but as the apex was wide the paste accidentally got extruded into the periradicular lesion **(Fig.2B**). The patient did not report any symptoms hence, was advised anti-inflammatory analgesics in case he developed pain and asked to report immediately if the symptoms worsened. The patient did not turn up for the third appointment for 2 months and reported that he was asymptomatic during this period. The follow-up radiograph at this visit showed partial resorption of the Ca(OH)2paste **(Fig.2C**). The paste was cleared off from the canal with H-files (Mani Prime Dental, Mumbai)and was irrigated with 3% sodium hypochlorite and 17% EDTA (Dent Wash, Prime Dental, Mumbai) and dried with absorbent points (Dentsply Maillefer, Ballaigues, Switzerland). The root canal was obturated with AH Plus sealer(Dentsply De Trey GmbH, Konstanz, Germany) and gutta-percha (Dentsply Maillefer, Ballaigues, Switzerland) by using cold lateral condensation technique. The access cavity was restored with composite restoration (Filtek Z350, 3M ESPE). Maxillary right central incisor when checked again for vitality with electric pulp tester gave a positive response so it was also restored with composite restoration (Filtek Z350, 3M ESPE)(Figure 3). The follow-up radiograph after 8 months showed complete resolution of the periradicular lesion and resorption of the Ca(OH)2 paste**(Fig.2D).**

Discussion:

When there is a large and chronic periradicular lesion, the deliberate placement of Ca(OH)2 beyond the apical foramina into the periradicular tissues has been advocated to benefit from;anti-inflammatory activity, neutralization of acid products, activation of the alkaline phosphatase, antibacterial action[11]and by allowing the connective tissue invagination into the lesion.[12]

Tronstad et al., have speculated that it may have a direct effect on inflamed tissue and epithelial cystic lining and in this manner would favor periradicular healing and encourage osseous repair.[13]Such deliberate overextension is however not, widely advocated, since periradicular extrusion of Ca(OH)2can have damaging effects. Reports dealing with bone necrosis and continuing inflammatory responses in repaired mechanical perforations[14], the neurotoxic effects of root canal sealers[15], cytotoxicity on cell culture[16], damaged epithelium with or without cellular atypia when applied on hamster cheek pouches[17], cellular damage following early Ca(OH)2 dressing of avulsed teeth[18] and necrosis of buccal gingiva and mucosa after periradicular overextension due to alkaline burn [19] have been presented.

The present case report has shown that when Ca(OH)2 paste containing silicone oil and Iodoform was applied as an intracanal medicament and accidentally extruded into the periradicular lesion associated with pulpless tooth, there was no detrimental effect, throughout the period after the Ca(OH)2 paste was extruded, the tooth was continuously free of symptoms. The Ca(OH)2 paste resorbed completely in 8 months and the periradicular lesion healed.

The literature reported by other authors did not show complete resorption of the $Ca(OH)_2$ paste as the paste they used contained barium sulfate as the radiopaque

Fig.2A:Pre-operative radiograph showing enamel and dentin fracture in mandibular left central incisor with immature closure of the apex and periradicular lesion

Fig 2B. Accidental overextension of $Ca(OH)_2$ paste (Metapex) into the periradicular lesion.

Fig.2C:Two months after accidental extrusion, note the partial resorption of $Ca(OH)_2$ paste.

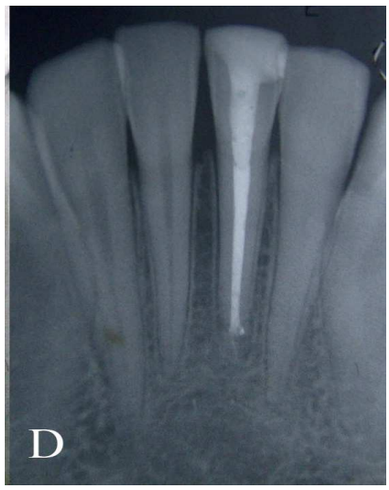

Fig 2D. 8 months follow up showing complete resorption of the $Ca(OH)_2$ paste and healed periradicular lesion.

material[20, 21].Metzger et al., have reported that Ca(OH)2 pastes containing radiopacifiers was not readily resorbed and led to residual radiopacity.[22]The possible reason for complete resorption of Metapex may be that it contains iodoform and not barium sulphate to improve its radiopacity. Iodoform also provides antiseptic action due to iodine release in the nascent state.[23] Hence, the periapical healing was complete with resorption of the residual Metapex.

CONCLUSION:

Though in the present case report it is seen that there were no adverse clinical signs and symptoms of extrusion of Ca(OH)2 paste containing iodoform, it is better to be cautious, as long term clinical studies have not been done on the solubility of the radiopacifiers in the periapical area as some radiopacifiers have shown complete dissolution and some others remained. Radiopacifiers containing metals like barium, bismuth are less likely to resorb so

Fig 3: Post-operative view after restoration of the teeth with composite.

when selecting pastes containing these metals caution should be excised not to extrude the paste beyond the apex.

Conflicts of Interest: There are no conflicts of interest.

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