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Iatrogenic Periapical Extrusion of Calcium Hydroxide Paste in Endodontics: A Case Report

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ABSTRACT:

Calcium hydroxide has been used by endodontics throughout the world since Hermann introduced it to dentistry in 1920. It is used as intracanal medicaments in dentistry because it helps to reduce intracanal microorganism load. In this paper we will discuss a case of mandibular molar with large periapical lesion in which calcium hydroxide paste was used as intracanal medicaments. There was an accidental extrusion of that paste during application. The patient was recalled at regular interval for six months. The follow up showed that the extruded material didn't do any bad effect of periapical healing.

Introduction:

Calcium hydroxide is one of the most biocompatible substance that has been extensively used in medical research, and it is widely used for treating intracanal infections. calcium hydroxide is mainly used in that cases where a large periapical lesion is present. The intracanal placement of calcium hydrate can be through with a lentulospiral or a syringe-based delivery system into the root canal.[1] If it is accidentally extruded periapically there may be swelling, nerve paraesthesia or delayed healing. The purpose of this article is to discuss about such a case of periapical extrusion of calcium hydroxide and it actually didn't effect the periapical healing.

Case Report:

A 28 years old female came to the department of conservative Dentistry and endodontics with chief complain of pain & swelling in her lower right posterior tooth since past 15 days. On clinical and radiographic examination, 46 was diagnosed with Chronic irreversible pulpitis with perapical abscess(Figure 1). Heat & cold test confirmed that the tooth was non vital. The IOPA radiograph revealed the presence of a periradicular lesion in association with the tooth. After taking patient's consent and the need of periodic recall mentioned, it was decided to treat the tooth with non surgical root canal treatment.[2] At first the access cavity preparation was done using Endo access bur (Dentsply Maillefer, Ballaigues Switzerland) without anaesthesia and working length was measured using electronic apex locator and confirmed by radiograph (Figure 2). The biomechanical preparation was done by Protaper gold rotary files (Dentsply Maillefer, Ballaigues Switzerland) till F2 file, under copious irrigation with 3% sodium hypochloride and normal saline. The three canals were dried using sterile paper points and calcium hydroxide containing Iodoform- calplus(Prevest den pro) was introduced using pressure syringe system into the canals.

During this procedure the calcium hydroxide paste was accidentally extruded into the periapical tissues (Figure 3). No pain was reported by the patient during placement of calcium hydroxide paste. Access cavity was sealed with Cavit temporary cement. The patient was recalled after 15 days, the provisional restoration was removed. During the second appointment canal was properly irrigated, dried with sterile paper points and finally obturated with Gutta Percha using the single cone technique with BioRoot Rcs sealer. Then the access cavity was sealed and tooth restored with composite restoration.

After the RCT, patient was recalled at 1 months, 3 months and 6 months intervals. During that time period the patient was asymptomatic. Radiographs were taken at regular intervals (Figure 4 & 5) The radiographs revealed a radiopaque (white) spot in the periapical region where calcium hydroxide paste was unintentionally extruded and moreover showed complete healing of the periapical lesion. Finally the crown was placed at 6 months interval (Figure 6)

Figure 1 : Pre-operative Radiograph #46

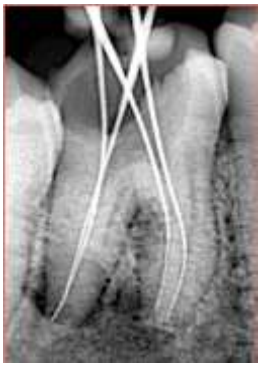

Figure 2 : Working length determination Radiograph

Figure 3 : Placement of Calcium hydroxide dressing with unintentional extrusion into periapical area

Figure 4 : Obturation done after 15 days on second appointment

Figure 5 : 3 months recalled radiograph showing the peri apical leason

Figure 6 : 6 months recalled radiograph showing no periapical healing of lesion and crown placemed

Discussion:

The following case showed that there was an iatrogenic accidental extrusion of calcium hydroxide paste containing iodoform into the periapical region during the application of intracanal medicament by pressure syringe but it had no bad effect throughout the recalled period and finally healing occurred properly. Calcium hydroxide pastes are biocompatible, resorbed from the periapical region, cause no foreign body reaction and therefore the overextrusion of iodoform paste had no effect on the success of the treatment.[3]

Calcium hydroxide has antibacterial properties and has the ability to repair and helps for hard tissue formation. The bactericidal effect is activated by its high alkaline Ph. The release of hydroxyl ions in an aqueous environment mainly presence of water is related to the antimicrobial property. These ions are highly oxidizing free radicals that destroy bacteria by a) damaging the cytoplasmic membrane b) protein denaturation c) damaging bacterial DNA.[4]

In this presented case senario it was observed for six months and the extruded calcium hydroxide didn't alter or causes harm of apical healing. Partial resorption can be a possible chance for the paste contains iodoform. In the history of endodontics iodoform is mainly used as a radiopaquing agent in $Ca(OH)^2$ pastes. But when $Ca(OH)^2$ paste containing iodoform is extruded beyond the root apex, the iodoform may adhere the root apex and is not fastly resorbed over time.[6]

Histopathological reports tell that calcium hydroxide in contact with periapical structures lead to lymphoplasmacytic infiltration and may cause necrosis. Most case reports suggest surgical management of extruded intracanal medicament to facilitate the periapical healing.[7]

In a study it was investigated that the addition of a vehicle in calcium hydroxide influenced the healing process of the periapical region; The resorption of the calcium hydroxide material and were mainly the histological features when the vehicle was water soluble.[8] Actually the biological effects of calcium hydroxide causes the activation of alkaline phosphatase, which, induces the mineralization process and helps to deactivate and damage the bacterial enzymes causing the antimicrobial effect. Some vehicle causes high degree of solubility when the calcium hydroxide paste remains in direct contact with tissues and tissue fluids help to become instant soluble and resorbed by macrophages. [8]

De Moor and De Witte concluded in their study that in extensive $Ca(OH)^2$ over extrusions, healing and hard tissue repair may took six months to be complete.[9]

BioRoot RCS is a bioceramic endodontic sealer which is very much biocompatible and possesses osteoinductive properties. It helps to stimulate periodontal ligament fibroblast cells promoting periapical healing.[10] This case report demonstrated an increased rate of periapical healing, 3 and 6-month post – op.

Conclusion:

This case showed that although the extensive over extrusion of $Ca(OH)^2$ paste containing iodoform through the periapical rgion does not affect to compromise the periapical healing but despite this finding the overextension of dental materials like intracanal medicaments is not advocated because any material can cause foreign body reactions like pain, swelling, hypersensitivity. To be safe it is advised to use these materials very carefully during day to day dental practice

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