

Effect of Iatrogenic Extrusion of Calcium Hydroxide Paste on Periapical Tissues with Periapical Pathology: A Case Report

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ABSTRACT:

A 30-year-old man was referred for the evaluation of persistent pus drainage with respect to #12. Imaging examinations showed a large amount of radiopaque/hyperdense material spread and associated radiolucency in upper anterior region w.r.t. tooth #12. Clinicians should be aware that Ca(OH)₂ when in contact with periapical tissues may lead to persistent toxicities, such as necrosis, pain and paraesthesia. Therefore, injectable Ca(OH)₂ systems should be used with caution because they can cause paste extrusion and damage to the surrounding tissues. The present case demonstrates delayed periapical healing and pus discharge and other deleterious effects following the extrusion of Ca(OH)₂ paste beyond root apex.

INTRODUCTION

Endodontic treatment requires the use of intracanal medicaments that should eliminate bacteria and simultaneously prevent their growth. Calcium hydroxide is one of the most commonly and frequently used intracanal disinfection medicament. Its clinical success is mainly attributed to its alkaline pH, bactericidal effect and its ability to dissociate rapidly into hydroxyl and calcium ions.¹ Non-setting Ca(OH)₂ paste in pressure syringe system is commonly used in root canal therapy. Although it has been considered as a safe agent², a few reports dealt with the negative side effects of Ca(OH)₂ including bone necrosis and continuing inflammatory response in repaired mechanical perforations, the neurotoxic effect of root canal sealers, cytotoxicity on cell cultures, damaged epithelium with or without a cellular atypia when applied on hamster cheek pouches and cellular damage following early CaOH₂ dressing of avulsed teeth. The extrusion of small amounts of Ca(OH)₂ paste into the periradicular tissues is well-tolerated. Conversely, when dressing materials are close to or in intimate contact with apical foramen nerve structures, such as nearby neurovascular bundles, hypoesthesia, paraesthesia or dysesthesia may occur as a consequence of the direct contact of Ca(OH)₂ with connective tissue, which causes a continuous inflammatory response and may lead to superficial necrosis in patients undergoing endodontic treatment.^{3,4}

Case Report:

A 30-year-old man was referred for the evaluation of persistent pus drainage with respect to #12. Imaging examinations showed a large amount of radiopaque/hyperdense material spread and associated radiolucency in upper anterior region w.r.t. tooth #12. His medical history was unremarkable. After local anesthesia infiltration (Lidocaine 2% with epinephrine), access cavity was refined, cleaning and shaping processes were performed by Ni-Ti rotary instruments and irrigant. The working length was determined by electronic apex locator and confirmed by radiography. After completion of the cleaning and shaping of the root canals, CaOH₂ paste was inserted into the canal, then access cavity was temporarily filled by Cavit. To evaluate the affected area, removal of necrotic tissues and extruded materials, peri-radicular surgery was performed. After raising a mucoperiosteal flap from #11 to #24 with a releasing incision positioned mesial to premolar, ischemic and necrotic tissue area and extruded CaOH₂ was observed. The tissue was curettaged until healthy and bleeding bone was evident. The area was irrigated with saline throughout the procedure. The excavated tissues were immersed in 10% formalin solution for histopathological analysis. After suturing, patient was prescribed Ibuprofen (400mg) and Amoxicillin (500mg, TDS for 5 days) and to return for a review appointment two week later.



Fig. 1 : Pre-operative Xray



Fig. 2 : Working Length determination



Fig 3 .Mucoperiosteal Flap Raised



Fig 4. Extruded Ca(OH)₂



Fig 5. Granulation removed and apicoectomy was done using MTA

Histopathological evaluation:

The tissue sections were stained with H & E and examined by light microscopy for histopathological changes. Histopathological analysis revealed areas of degenerative changes, inflammatory tissues, dead bony spicules and necrosis in the tissues in direct contact with the injected paste.

The first follow up:

On the first recall appointment (two weeks after suture removal), complete closure of the lesion with soft tissue was observed.

Second follow up:

Approximately 3 and 6 months later, clinical and radiographic evaluation revealed no signs and symptoms and no lesions in periapical radiograph.

Last follow up:

One year later, examination revealed complete clinical and radiographic normalcy with normal pocket depth.

DISCUSSION:

The effective chemo-mechanical debridement during root canal preparation is recognized as one of the crucial steps in its disinfection. There are various steps performed during endodontic therapy, and it is difficult to examine which specific step may improve outcomes. These steps include irrigation, instrumentation and intracanal medication. Intracanal medicaments are considered to be an integral part of endodontic treatment as it curtails bacterial regrowth and possibly even improve bacterial suppression.⁵ Calcium hydroxide has been the prototype of many intracanal medicaments with its high pH and antibacterial properties and is considered to be one of the most appropriate and effective, especially in teeth with periapical lesions. It promotes repair of tissues by controlling the inflammatory action by its varying mechanism of actions including hygroscopic action, calcium proteinate bridge formation, neutralizing osteoclasts acid products, inducing cellular differentiation and destruction of the epithelium thereby allowing the connective tissue invagination into the lesion.⁶ It is generally thought that when CaOH₂ does not come into direct contact with surrounding soft tissues, problems do not either occur or they may occur with a mild transient nature.⁷ However, if CaOH₂ comes into direct contact with the periodontal and gingival tissues, surgical removal is necessary.

CONCLUSION: Caution should be taken when using premixed, pressure syringe CaOH₂ system in root canal therapy.

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