

Nonsurgical Clinical Management of Huge periapical Lesion Using Calcium Hydroxide-Iodoform-Water Paste

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Abstract

This case report details a procedure for treating periapical lesion without resorting to extraction. The most common intracanal medication was a calcium hydroxide water-based paste [CHWP]. In addition, cystic lesions caused by the posttraumatic loss of permanent teeth were treated with CHWP. After a lesion was diagnosed, radiographs were taken to confirm its size and location, make sure the treatment was administered properly, and track the bone's healing process. There were no reports of significant discomfort, problems, or the cyst failing to heal. The less invasive treatment prevents the loss of teeth and minimizes bone loss. Failed root canal treatments can be saved by cyst management with CHWP. The findings indicate that CHWP has the potential to promote bone regeneration in two phases: a quick initial phase and a more gradual latter stage.

Keywords: Tooth; Nonsurgical; Paste; Epithelium

Introduction

A periapical lesion develops when the body's immune system reacts violently to bacteria in the area around a tooth's root and canal. Perforation of the maxillary sinus or other hard tissues by periapical lesions is a possibility. Bone resorption, or local osteomyelitis, is brought on by the infection around the tooth's root. Cellulitis of the soft tissues, resulting in facial swelling, is another hallmark of severe local jawbone osteomyelitis. Granuloma or cysts with periapical lesions are sometimes the result of tooth trauma. Cysts are semisolid tissue surrounded by epithelium, whereas granulomas are formed of solid soft tissue. Lesions appear on radiographs to be unilocular, lucent, spherical, or pear-shaped, with a thin rim of cortical bone outlining their borders. Cyst development occurs between 6% and 55% of the time in smaller lesions and 100% of the time in lesions larger than 20 mm. On the other hand, the incidence of granulomas varies from 9.3 to 87.1%, and the rate at which abscesses form from 28.7% to 70.0%. Lesion development can be triggered by epithelial proliferation or other molecular processes. In spite of this, microbial waste products are the most common cause of periapical lesions because they produce an accumulation of osmotic fluid in the lumen. Therefore, disinfecting the area around the tooth might alleviate hydrostatic pressure caused by osmotic fluid and lessen the severity of periapical ulcers. Periapical lesions brought on by infection require a two-pronged approach to treatment. Initially, antibiotics (such metronidazole, ciprofloxacin, and minocycline), chemical irrigation, and disinfectants are used for antibacterial treatment (i.e., calcium hydroxide). Calcium hydroxide is widely used as a disinfectant for the root canal system, despite the fact that it is ineffective as a dressing for the canals themselves. Second, reducing the water pressure is counterproductive; this can be done through decompression, aspiration, or irrigation by aspiration. The root canal treatment industry has developed commercially available forms of calcium hydroxide-iodoform-water based paste (CHWP). Using a disposable syringe tip, the paste is injected into the patient. Calcium hydroxide, the paste's principal ingredient, had its properties and mechanism of action thoroughly evaluated. Two clinical case reports in the past ten years have described the inadvertent extrusion of Calcium hydroxide paste Oil based [CHISP] from the root into the periapical lesions. Additionally, no adverse events or problems related to CHISP placement in bone were reported in either study. An intriguing study using a rat model has shown that CHISP can promote bone repair. Increased BMP-2 expression was observed histologically and

molecularly after Vitapex [CHISP] was used to treat periapical lesions in rats. The removal of the root canal paste made of calcium hydroxide oil is where the majority of the debate centres. Once calcium hydroxide paste has been inserted into the root canal, it is quite impossible to entirely remove it. In comparison to oil-based paste, the root canal retrieval rate for the calcium hydroxide system is 70%. The purpose of this study was to evaluate the efficacy of using CHWP as part of a non-surgical strategy for treating periapical lesions. CHWP's antibacterial and bone regenerating characteristics make it a popular choice [1-6].

Case Report

Using local anaesthesia (2% Xylocaine Dental with epinephrine 1: 50,000, Novocol Pharmaceutical of Canada, Inc., Ontario, Canada), CHWP [RC Cal, PRIME DENTAL INDIA] was administered to the patient. The patient was told of the new treatment choice after radiographic confirmation of periapical lesions. With the patient's approval, we were able to perform a non-invasive root canal procedure. In brief, rotary and manual files were used to open and shape the canal of the infected teeth after the pulp had been removed and the area cleansed. The file needs to be taken up around 1–2 mm past the apical foramen in order to relieve pressure and establish drainage through the canal. The high-volume suction aspirator, to which a 22 G needle was attached, produced the necessary negative pressure. After inserting the needle into the canal, the device was turned on for three to five minutes. Sometimes a buccal palatal palpation method is necessary to drain the cystic fluid from the periapical lesion. The cystic fluid was drained by palpating the intraoral swelling, which pushed it through the access hole. Root canals were then irrigated with a solution of 2% Chlorhexidine Gluconate and EDTA to wash out bacteria and sterilize

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the area. Then, the periapical lesions were brought as close as feasible to the tip of the CHWP syringe. The canal was then injected with the paste to fill the lesion. The intraoperative radiographic monitoring of the filling position allowed for precise control of the procedure. As a stopgap measure until the next appointment, a temporary restoration was placed in the access canal to seal off the coronal leakage. After 7 days, 2% Chlorhexidine was used to clean out the newly formed root canal. Radiological examinations were performed at 3, and then 12, months after therapy to check on the progress of healing. Dentists checked in with patients every day for the first week. The dentists also inquired about any allergic reactions, complications, or unwanted effects, in addition to the usual pain assessment. Information gathered as a result of the follow-up was recorded. Paste separation from the crown was visible on x-rays. Bioceramics [Cera seal-B, MAARC INDIA] was used to permanently obturate the canal. In addition to being tissue-compatible, bacteriostatic, and radiopaque, cera seal B is also an excellent tissue adhesive. The canals were sealed using Gutta-percha (VDM, Munich, Germany). To prevent bacterial reinfection, it is essential that the canals be sealed. The final step was to fill the tooth cavity permanently using composite material. The radiographs taken after surgery show that the periapical lesion has healed and the bone changes are for the better. The patient reported no discomfort after surgery. No mucosal drainage incision was necessary, and the intra oral edoema resolved completely. In addition to apical lesions, it appears that CHWP can be applied successfully to cystic lesions. More robust clinical trials are needed to support its use in the literature.

Discussion

Inflammation of the soft and hard tissues surrounding a tooth is called a periapical lesion. Bone loss, bleeding on probing, and pus discharge are all symptoms of the inflammation. Pulp necrosis provided the ideal setting for bacteria to secrete toxins into the periapical tissue. The inflammatory response caused by this release is what causes the periapical lesions. Froum's 2011 systematic literature analysis demonstrated that lesion infection control and regeneration of lost support constitute the best management of lesions. Large periapical lesions can be treated with anything from traditional nonsurgical root canal therapy to surgical techniques. When a tooth is non-vital but has an infected root canal, non-surgical root canal therapy is always recommended. The key to treating periapical lesions is removing any germs that may have made its way into the root canal. Pre-blended pastes comprising calcium hydroxide, iodoform, and silicon oil are sold under brand names like Vitapex, Metapex, and Tegapex. After a pulpectomy, the products can be utilised either as a short-term or long-term root canal filling. The paste encourages the apexification and apexogenesis of apical meristems and has potent antibacterial and bacteriostatic effects. In the presence of a strong acid, calcium hydroxide dissociates chemically into calcium and hydroxyl ions, resulting in an ionic action. A combination of calcium and hydroxyl ions promotes mineralization and has antibacterial properties. The high pH of calcium hydroxide neutralises endotoxins produced by anaerobic bacteria, and it also activates "blast" cells, which helps apexogenesis. Root extension and apical closure are aided by alkaline phosphatase and other tissue enzymes thanks to the action of hydroxyl ions on the bacterial cytoplasmic membrane. To kill bacteria, iodoform breaks down into free iodine. Therefore, iodine removes root canal and periapical tissue infection by precipitating protein and oxidising important enzymes. Furthermore, iodoform improves radiopacity, allowing for clearer imaging. Silicone oil is a lubricant that keeps calcium hydroxide in the root canal by completely coating the canal walls. Unfortunately, despite its poor removal from the root canal

space, the use of oil-based CHISP is contraindicated in long-term root canal therapy. Therefore, a water-based system is always a great option. Nonsurgical treatment of periapical lesions with a paste made of calcium hydroxide, iodoform, and water has been shown to be effective. The treatment's effectiveness is jeopardised by the bone-regenerating effects. CHWP was used to repair bone around the roots of avulsed teeth after trauma, confirming its restorative effects. When contrasting CHWP to standard treatment, one of the most important characteristics is how quickly the periapical lesion heals, typically within 2 months for patients reporting mild to moderate pain. Analysis of material retention needs a 3D image set, however having access to this data can improve our comprehension of the bone-material interaction. In addition to dental applications, the regenerative effects of CHWP can be studied in the fields of orthopaedics and trauma surgery [1,7-10] [Figures 1-4].



Figure 1: Pre operative radiograph.



Figure 2: CHWP injected into the lesion in the first appointment.



Figure 3: Master cone radiograph post 7 days showing healing of the lesion.



Figure 4: Post-operative radiograph, one year follow up.

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