



Accidental Extrusion of Sodium Hypochlorite beyond Root Apex—A Case Report

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Abstract:

Endodontic treatment is a routinely performed clinical procedure in dental practice. Irrigation with sodium hypochlorite plays an important role in the debridement and disinfection of the root canal system. We present a case of inadvertent injection of sodium hypochlorite into the periapical tissues, causing tissue destruction, extraoral swelling, and ecchymosis. Clinical symptoms and management of the condition are discussed.

Keywords: Hemorrhage, Emphysema, Sodium hypochlorite, Complications, Root canal irrigant.

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1. Introduction

Use of chemical irrigants such as sodium hypochlorite and hydrogen peroxide as an adjunct to mechanical debridement of pulp canals is a common practice in endodontics. Sodium hypochlorite has been effective against a broad spectrum of bacteria and to dissolve vital as well as necrotic tissue. This and its lubricating property make it an excellent choice for intracanal irrigation. However, it has been shown that sodium hypochlorite has toxic effects when it comes in contact with vital tissues, resulting in hemolysis, skin and

mucosal ulcerations, necrosis, and swelling^{1,2}.

In dental literature, several cases have been reported with varying tissue damage due to inadvertent injection of root canal irrigants. The following case report describes one such complication caused due to extravasation of Sodium hypochlorite into the periapical tissues.

2. Case Report:

A 37-year-old female patient reported to the Oral medicine department with a complaint of pain and swelling on the right side of her face.



History revealed that she was undergoing root canal therapy on her maxillary right second premolar. The procedure was started by her general dentist the previous day under local anesthesia, access cavity was prepared and the canal was debrided with a chemical agent and closed dressing was given. Later in the evening patient started developing pain and swelling in the region & discoloration of the skin on the affected area. The swelling gradually increased in size. Her medical history was insignificant.

Physical examination revealed that she was anxious and under stress. Vital signs were normal.

There was a diffuse swelling on the right side of the face extending from infraorbital margin to the lower border of the mandible, mediolaterally from the ala of the nose to 2cm anterior to the tragus of the ear. Ecchymosis was present on the overlying skin extending from the right corner of the lip (Figure 1).

Intraoral examination revealed an extensive irregular ulcer extending from the right buccal sulcus in the region of first and second premolars to the buccal mucosa with irregular margins. The surface was covered with slough (Figure 2).

A tentative diagnosis of tissue necrosis secondary to chemical root canal irrigant was made. Later it was confirmed that Sodium hypochlorite was used as an irrigant.

The patient was given Amoxicillin 500mg three times a day and Ibuprofen 200mg thrice a day. The closed dressing was removed and the root canal was left open. She was advised chlorhexidine mouth rinse three times a day and cold pack over the skin followed by warm application. A follow-up appointment the next day showed a marked reduction in signs and symptoms.

Over a period of one week, the swelling and facial lesion showed resolution (Figure 3) and the intra-oral ulcer had also healed considerably (Figure 4). Later root canal treatment was completed successfully using saline as an irrigant.

3. Discussion:

Sodium hypochlorite is often used as an irrigant during routine endodontic treatment. Although a number of different solutions are available, Sodium hypochlorite in various concentrations is the most frequently used irrigant for sterilization and debridement of canals. It is well recognized to be effective against a broad range of pathogens, gram positive and gram-negative bacteria, fungi, spores, and virus including human immunodeficiency virus^{3,4}. Hydrogen peroxide also has been widely used for irrigation of the root canal system, although it is less effective in killing microorganisms^{5,6}.

The literature contains several case reports of complications due to inadvertent injection of irrigant into the periapical tissues causing emphysema, ecchymosis, allergic reactions and necrosis of bone & the soft tissue^{7, 8,9,10,11}. These complications occur due to incorrect working length determination, widened apical foramina, forceful injection of irrigant into the periapical tissue due to wedging of the irrigating needle or lateral canals¹². Precautions must be taken in these cases to prevent such accidents.

When Sodium hypochlorite is forced into the periapical tissue inadvertently, the sequelae of injury is⁴ - Excruciating severe pain for two or five minutes, Immediate swelling of the area with the spread of the tissue reaction to the surroundings through the loose connective tissue, Profuse hemorrhage either interstitially or manifesting intraorally. As the tissue



destruction progresses, extreme constant discomfort replaces the initial severe pain. Once the initial bleeding stops interstitial oozing still continues because of lysis of cellular structures and surrounding vasculature. This results in significant ecchymosis².

When such incidents occur, the dentist should remain calm and assist the patient by reassuring. The treatment should be carried at minimizing the swelling, controlling pain and preventing secondary infection. Use of cold packs externally is recommended initially, followed by warm compression and warm mouth rinse to stimulate microcirculation. Antibiotics are recommended depending on the severity of tissue injury and the presence of subcutaneous necrotic tissue and dead space which can promote secondary infection. In more severe cases immediate hospitalization and surgical intervention might be required. This is to provide decompression, to facilitate drainage, meticulous debridement and to promote healing^{1,2}.

Most of the cases resolve after seven to ten days. When acute symptoms subside, endodontic treatment may be completed using mild irrigating solutions preferably saline. Some patients however left with complications like paresthesia and facial nerve weakness^{5,7}.

Guivarch et al have performed a systematic review of 52 reported cases of sodium hypochlorite accident published between 1974 to 2015. They reported that sudden pain, profuse bleeding and almost immediate swelling constitute a triad of signs/symptoms pathognomonic of sodium hypochlorite extrusion. All or most of the signs and symptoms resolve within few weeks. Permanent sequelae include nerve lesions and scar tissues. They recommended that the future case reports should provide

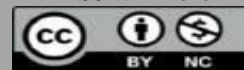
the irrigation method, immediate extrusion signs/symptoms, management and etiology of the accident, post-extrusion monitoring and prognosis.¹³

4. Conclusion:

Although Sodium hypochlorite is a very effective intracanal irrigant in endodontic practice, complications are bound to occur due to accidental injection into the periapical tissues as it is extremely cytotoxic. Care should be taken while irrigating teeth with wide open canals and perforated teeth. Canals should be irrigated with gentle pressure and movement. This will reduce the chances of causing accidental injection of irrigant into the periapical tissues, thereby preventing tissue injury and its complications.

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Figures & Legends:



Figure 1: Clinical picture showing extra oral swelling with ecchymosis.



Figure 2: Clinical picture showing intra-oral ulcer covered with necrotic slough.



Figure 3: Clinical picture showing the healing of facial lesion after a week.



Figure 4: Intra oral picture showing Healing ulcer.