





# Inadvertent Injection of Sodium Hypochlorite to Oral Mucosa

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## Abstract

It is important to carefully use sodium hypochloride (NaOCl) in its clinical applications. Non-careful use of cytotoxic agents (NaOCl, etc) may cause serious complications. In this case report, a treatment approach to paresthesia and tissue necrosis after inadvertent injection of 1% NaOCl solution into oral mucosa is presented. Pain, edema, loss of sensation, redness on the cheek, and difficulty in swallowing were observed during the patient's clinical examination. The patient was experiencing severe pain and a burning sensation during injection. The patient was administered intraoral drugs, such as antibiotics (amoxicillin 1000 mg two times per a day for two weeks), alpha lipoic acid (300 mg one time per a day for one month), and debridement of oral mucosa. Consequently, re-epithelialization of necrotic tissue was observed in the 3<sup>rd</sup> month. All symptoms disappeared completely in the 6<sup>th</sup> month.

**Keywords:** Sodium Hypochlorite, oral mucosa, sodium hypochlorite, inadvertent injection, complication

## INTRODUCTION

Odontogenic infections are characterized by painful soft-tissue swelling, high fever, regional lymph enlargement, trismus, and leukocytosis. These can occur along with periodontal infections caused by necrotic pulp, trauma to the mucosa, toxicity of impurities, and surgical interventions (1).

The main principle in dental treatment for eliminating aerobic and anaerobic bacteria observed in necrotic pulps of orofacial abscesses is the debridement of the necrotic tissue and application of intrapulpal antibacterial medications (2). Necrotic tissue irrigation solutions mainly include chlorhexidine, proteolytic enzymes, alkaline solutions (NaOCl), and saline (3). Because of it is a broad-spectrum antimicrobial, it eliminates necrotic purulent tissue residues, and alkaline sodium hypochlorite (NaOCl) solution (1%) is applied as an effective antimicrobial agent in dental treatments (4).

Usually, 1% NaOCl is injected in the dental pulp cavity at a dose of 2-10 cc using a dental injector for debridement. However, besides the antimicrobial effect, NaOCl also has cytotoxic effects and allergenic properties (5). For endodontic treatment, NaOCl perfusion for various reasons may cause serious injury to the patient (6). Therefore, serious complications can occur when injected in soft tissue.

In this case report, we have discussed the treatment management of the complications that occur owing to accidental injections of a solution containing 1% NaOCl (5 cc) into the oral mucosa during dental treatment.

## CASE PRESENTATION

A 55-year-old male patient applied to our clinic to admitted to the clinic with a complaint of dental abscess. Pulp necrosis was diagnosed, and its treatment was planned. While initiating the procedure, 1% NaOCl (5cc) solution was inadvertently injected into the tissue. The patient immediately stated that he was experiencing burning, stinging, and sharp pain. Therefore, induction of local anesthesia was immediately stopped.

It was noticed that the 1% NaOCl was applied by the physician. The patient was first administered a 15-mg ampoule of pheniramine maleate and an 8-mg ampoule of dexamethasone into the muscle. The patient had complaints of difficulty in swallowing. Therefore, the patient was consulted to an otorhinolaryngologist, and the otorhinolaryngological examination revealed oropharyngeal hyperemia.

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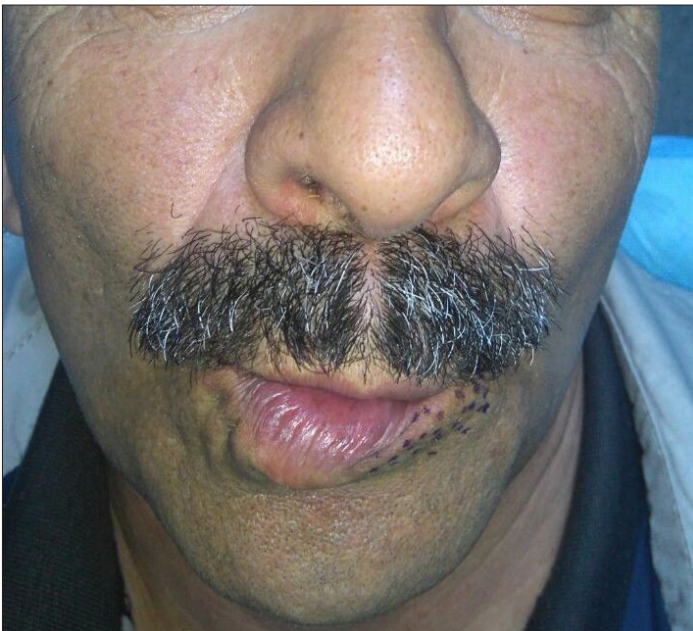
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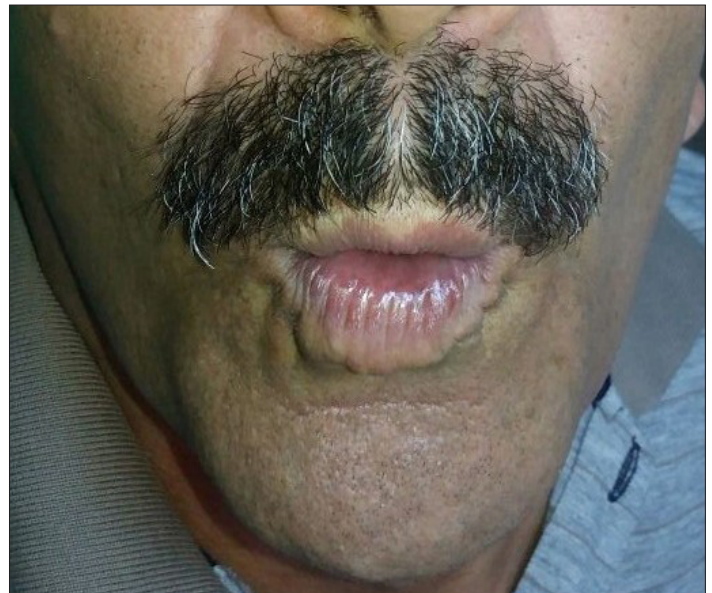
**Figure 1.** Necrosis of the oral mucosa within 1 week owing to sodium hypochlorite perfusion into the tissue



**Figure 4.** Re-epithelialization of the necrotic tissue was observed only after one month



**Figure 2.** Marginal mandibular nerve (Left) paralysis



**Figure 5.** Nervus mentalis paresthesia decreased after 3 months



**Figure 3.** Necrotic tissue was debrided every 3 days for 4 weeks

A 55-year-old male patient had tissue necrosis of the oral mucosa within 1 week of NaOCl perfusion into the tissue (Figure 1). Left marginal mandibular nerve paralysis (Figure 2) was also observed. Clinical control was performed every three days. On the 7<sup>th</sup> day of the oral examination, there was an increase in the necrosis of the oral mucosa of the left vestibular mucosa. Necrotic tissue was debrided every 3 days for 4 weeks (Figure 3), and dressing was done using rifampicin ampoules. Intraoral administration of amoxicillin 1 g (2x1) and alpha lipoic acid 300 mg (1x1) was continued for 2 weeks.

To prevent irritation of the necrotic tissue, the patient was advised against smoking and consumption of hot food and alcohol. Re-epithelialization of necrotic tissue was observed only one month later (Figure 4). Mental nerve paresthesia decreased after three months (Figure 5). All symptoms disappeared after six months.

Written informed consent was obtained from patient's family who participated in this case.

## DISCUSSION

In clinical practice in dentistry, NaOCl is preferred for irrigation because of its antimicrobial effect, debridement ability, and low cost. When it comes in contact with vital tissues, NaOCl may cause haemolysis, skin ulceration, marked cell injury in endothelial cells and fibroblasts, and inhibition of neutrophil migration (7). Given the use of hypochlorite in dental practice, this complication is fortunately very rare. A severe acute inflammatory reaction of the tissues develops. This leads to rapid tissue swelling both intra orally within the surrounding mucosa and extra orally within the skin and subcutaneous tissues (8).

Superficial tissue injury is caused by reactions of NaOCl with proteins and fats in the tissue. Therefore, accidental swallowing and aspiration of NaOCl results in an emergency, which requires patient follow-up. Skin damage is an important complication that should be considered in contamination. Extrusion of NaOCl into tissues may cause chemical burns leading to extensive tissue necrosis. This also causes severe acute inflammatory reaction in tissues. When this complication occurs in the oral mucosa, it may rapidly cause edema, subcutaneous tissue swelling, edema, and hemorrhage (9).

Necrotic ulceration of the mucosa and neurological complications may occur as a direct result of chemical burns (9). The reactions of the tissues may appear immediately within a few minutes or later after hours (7, 9). Some different findings with respect to the complications depend on concentrations of the solution and applied tissue area. The treatment modality is determined by the degree and speed of soft-tissue swelling. However, the patient immediately should be hospitalized after administration of intravenous steroids and antibiotics drugs (10).

In these patients, development of necrotic tissue owing to secondary bacterial infection is a high probability. Therefore, use of antibiotic agents is required as part of patient management.

Debridement with surgical drainage may also be required depending on the degree of necrosis of the tissue and its characteristics (11).

## CONCLUSION

Invasion of NaOCl into the tissue can lead to serious complications that may cause tissue and nerve damage or airway obstruction.

In clinical practice, possible complications associated with NaOCl should be reviewed, precautions to minimize their risk should be discussed, and appropriate treatment protocol for tissue damage should be determined.

**Informed Consent:** Written informed consent was obtained from the patient's family who participated in this case.

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