

# Single visit endodontic management of Sodium hypochlorite accident: A case report.

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## Abstract:

Sodium hypochlorite (NaOCl) accident is a very serious complication that might occur if sodium hypochlorite extrudes beyond the root canal space. it leads to tissue necrosis and induces a massive acute inflammatory response with its associated sequelae such as pain, swelling, and profuse hemorrhage. This paper describes a single visit endodontic retreatment of a case that experienced an accidental extrusion of 5.25% NaOCl , and highlights the successful outcome.

## Key-words:

sodium hypochlorite(NaOCl), sodium hypochlorite accident, root canal irrigant.

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## Introduction:

Sodium hypochlorite ( NaOCl) accident is a very serious complication that might occur if sodium hypochlorite extrudes beyond the root canal space. Although Sodium hypochlorite is considered the most popular irrigant, its accident are not commonly encountered in the dental clinic. According to Kleir et al, survey of 719 American diplomats 26% have experienced this episode only once in their career of more than 10 years.<sup>[1]</sup> 58% have never encountered such complication.

The NaOCl accident occurs when there is a considerable amount of irrigant extruded beyond the root canal space which will eventually lead to tissue necrosis and induces a massive acute inflammatory response with its associated sequelae such as pain, swelling, and profuse hemorrhage.<sup>[2,3]</sup>

The NaOCl accident was first reported by Becker et al in 1974.<sup>[3]</sup> Most of the reported sodium hypochlorite complications occurred because of incorrect determination of endodontic working length, iatrogenic widening of the apical foramen, lateral perforation, or wedging of the irrigating needle.<sup>[2]</sup>

Sodium hypochlorite accidents were most frequently reported in the maxillary teeth (73%) compared with the mandibular teeth (21%).<sup>[1]</sup> There was a significant difference in the region of NaOCl accident,(70%) were occurred in the molar or premolar region, whereas(30%) in the incisor or canine regions.<sup>[1]</sup> Mandibular premolar and molar teeth are encased in a denser cortical plate, and their apices are located more centrally within the body of the mandible. In contrast to this, the buccal roots of maxillary premolar and molar teeth have only a thin covering of cortical bone, which probably predisposes these teeth to NaOCl accidents.<sup>[4]</sup>

In this paper we report a sodium hypochlorite accident case that was managed endodontically in single visit then followed up with a palliative treatment till the acute symptom disappeared.

## Case report:

A 33-years-old Saudi male patient was referred from the prosthodontist for assessment root canal treatment (RCT) of upper right second premolar (#15). Medical history was non significant ,he has no known drug allergies and currently taking no medication. Clinical examination revealed an asymptomatic tooth with defective temporary filling, recurrent caries and normal periodontal probing depth. The periapical (PA)



radiograph showed inadequate RCT and defective coronal restoration with no sign of periapical radiolucency [Figure 1].The diagnosis was previously treated tooth with Normal apical tissues. nonsurgical root canal retreatment was proposed for the patient because presence of coronal leakage and the presence of recurrent caries which might be a cause of failure if left untreated.

After administration of local anesthesia (Lidocaine 1:200.000 epinephrine, Septodont, USA) rubber dam was placed. Access cavity was reentered using diamond Endo Access bur #1, and Endo Z bur (Dentsply Maillefer, Switzerland). The previous canal filling (Gutta Percha) was removed using ProFile system (Dentsply, Tulsa Dental, Tulsa, OK) .06 taper ISO size 30 ,and size 35. The former was used for preparation of the apical third and the latter was used for the coronal two third. Two canals (P,&B) were found that merge into one canal apically. The root canals were shaped and cleaned to the apical terminus of pulp that was determined using Root ZX apex locator (J. Morita Co., Kyoto, Japan) in conjunction with periapical radiograph. Irrigation with NaOCl 5.25%(Clorox, Abudawad, Saudi Arabia) using double side-vented gauge 30 needle tip (Endo-Irrigation Needle; Transcodent, Germany). Before obturation and during the final flush of 5.25% NaOCl extrusion of irrigation to the periapical tissue had occurred through the buccal canal. Patient experienced severe pain immediately. Blood was oozing through the root canal space. A copious irrigation of the root canals using normal saline was done. After the canals were completely dry, obturation was done with 0.6 gutta percha size 35 and AH Plus sealer (De Trey Dentsply, Konstanz, Germany) using continuous wave compaction obturation short 1mm from WL .The immediate coronal sealing was double sealed with cavit (3M ESPE AG, Seefeld, Germany) and GIC (Fuji II; G.C. International, Scottsdale, AZ), [Figure 2].At the end of the appointment, suborbital swelling was evident [Figure3.A]. Afterwards, Patient was informed regarding the NaOCl accident and reassured.

prophylactic antibiotic Augmenten 1 gm (Augmenten, SmithKline Beecham, UK) two times daily for 7 days , Ibuprofen 600 mg ( Sapofen, Al-Qassim Pharmaceutical Plant, Saudi Arabia) three times daily for three days, Dexamethasone 8mg daily I.M injection (dexamethasone sodium phosphate, EPICO, Egypt) for two days were prescribed. Alongside, patient advised to hold a cold pack for the first day, then warm pack for two days.

On the second day, patient was seen for follow up. He didn't experience pain over the 24 hours. However intraoral hematoma and ecchymosis had arisen [Figure3.B]. Incision and drainage was performed at this visit.

On the fourth day, the swelling subside. Extra oral ecchymosis was noticed [Figure3.C].

After two weeks, almost all the signs and symptoms disappeared. Then, patient was referred back to prosthodontist for Post & core ,and crown the tooth [Figure3.D(1),(2)].

The patient used Commiphora myrrh tree as a mouth rinse (four times daily for five days), and honey as a topical coverage of the extra oral wound. Recalls were done six months later, complete healing was noticed Figure3.E (1),(2)]. .Tooth was permanently restored with crown after 9 Months.

#### Discussion:

The toxic effects of NaOCl occur because of its alkalinity (pH 10.8-12.9) and hypertonicity, which causes injury predominantly by oxidation of proteins and lipid membranes.<sup>[4,5]</sup> The acute response which includes sudden pain, and the swelling of the right face side that was described above are typical for NaOCl accident, and have been frequently published in the literature.<sup>[6]</sup>The sequel of these accidents includes severe sudden pain, as well as immediate swelling in the area. Several days of increasing edema, ecchymosis may occur accompanied by tissue necrosis and paresthesia, in addition secondary infections and possibility of airway



obstruction might happen in some cases.<sup>[7]</sup> The patient felt pain even though he was anaesthetized because the accident had occurred at the end of the visit.

The lack of coronal seal (by an inappropriate or absent temporary or permanent restoration) allows bacteria from the oral cavity to penetrate the obturating materials and eventually reach the apical foramen, thereby requiring retreatment or periradicular surgery.<sup>[8,9]</sup>

The recommendation in such cases is to place Intracanal medication (CaOH<sub>2</sub>), and postpone obturation of the offending tooth to the next visit. However, obturation was done in the same time since the canals were dry at the end of the procedure<sup>[10]</sup>. Moreover, numerous studies and systematic reviews evaluating the effectiveness (healing rates) and post treatment pain of single-versus multiple-appointment root canal treatment they have reported no significant differences between these two treatment regimens.<sup>[11-14]</sup> To avoid any more irritation to the periapical area which may result as extrusion of filling material or sealer beyond apical foramen, the level of obturation was intentionally made short 1mm from final WL.

After patient assurance conservative management was performed based on the severity of the accident. Intraoral incision was done to decompress the congested tissue and to provide seepage access for the accumulated inflammatory exudates.<sup>[7]</sup>

The profound anti-inflammatory properties of steroids drugs are well investigated and established. To the best of our knowledge, this is the first report used dexamethasone as anti-inflammatory postoperative medication in such cases. Several clinical studies reported that administration of dexamethasone in a systemic manner (oral, intramuscular, intraosseous) is capable of minimizing postoperative inflammation and consequent edema and pain after endodontic therapy or flare-up cases.<sup>[15-17]</sup> Although, many studies showed the routine use of antibiotics in conjunction with corticosteroids does not appear to be justified if it used for short time less than one week maximum even in those cases with a diagnosis of pulpal necrosis with periapical radiolucency,<sup>[18-20]</sup> In such situation appropriate prophylactic antibiotic therapy is highly recommended for two reasons: the possibility of infection's being forced from the root canals into the periapical tissues with the NaOCl irrigation, and the subcutaneous presence of significant amounts of necrotic tissue and dead space, which can promote secondary infection.<sup>[21]</sup> A single dose of glucocorticoid, even a large one, is virtually without harmful effects, and a short course of therapy up to 1 week in the absence of specific contraindications, is unlikely to be harmful.<sup>[22]</sup> In the same way, Drug interactions associated with the corticosteroids for short course appear to be minimal.<sup>[23]</sup>

It is very common that patient would prefer to use herbal medicines as alternative remedies.<sup>[24]</sup> Myrrh is an aromatic resinous material obtained from trees of Commiphora species.<sup>[25]</sup> A tincture of myrrh in alcohol has been advocated to be used as mouthwash, especially for treating painful throat infections.<sup>[26]</sup> Some studies have shown pain-relieving ability of myrrh.<sup>[27]</sup> Honey has been also used to treat infected wounds and burns, because it is hyperosmolar, and because it contains specific antimicrobial substances.<sup>[28]</sup>

### Conclusion

In comparison with other endodontic treatment complications sodium hypochlorite is considered a rare complication. Most of the patients recovered with a conservative supportive management within two to four weeks. Understanding the potential complications of this condition will allow appropriate management for patients suffering from sodium hypochlorite accident.

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Fig.1: pre-operative PA radiograph of tooth #15



Fig.2: Post-operative PA radiograph of tooth #15



Fig.3: immediate extra-oral swelling after NaOCl extrusion. developed



Fig.4: second day: intraoral hematoma



Fig.5: fourth day: Extra oral ecchymosis .

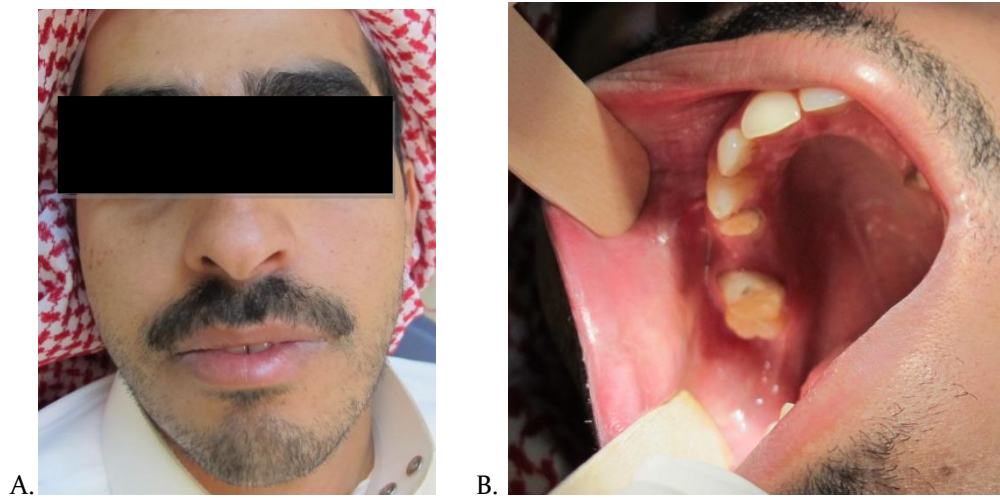


Fig.6: after two weeks. A. Extra-oral , B.Intra-oral

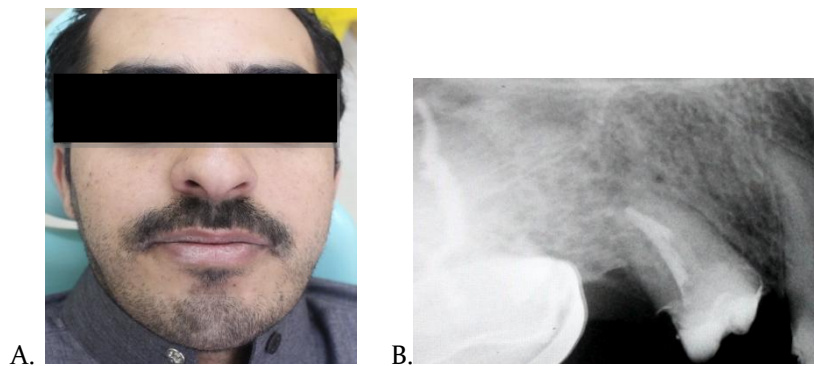


Fig.7: recall after 6 months. A. Extra-oral, B. Follow up PA radiograph.



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