

Sodium Hypochlorite Accident Associated with Endodontic Treatment of Maxillary First Molar

VARUN KUMAR¹, RUCHI JUNEJA², SNEHA PRIYA³
Keywords: Case report, Maxillary sinus, Root canal treatment

A 42-year-old-male patient reported to the Department of Dentistry with the chief complaint of pain in the upper left posterior teeth since two weeks. Pain was severe, spontaneous, responded to non steroidal anti-inflammatory drugs for short-term. He had history of pain in the same tooth one month back, which was relieved on medication. Intraoral examination revealed deep caries in maxillary left first molar. Percussion test with the back end of metallic handle of a mouth mirror elicited severe tenderness on percussion. Intraoral periapical radiograph of this tooth revealed a carious exposure with thickening of the lamina dura. A provisional diagnosis of chronic pulpitis with apical periodontitis was established.

After taking informed consent, non surgical endodontic treatment was initiated under inferior alveolar nerve block with 2% lignocaine with 1:80,000 adrenaline. Access preparation was done with an air rotor handpiece using #4 round diamond bur and a tapered safe ended carbide bur. Four orifices were located (mesiobuccal 1 and 2, distobuccal, palatal). Subsequently working length was established using an apex locator and confirmed with intraoral periapical radiograph [Table/Fig-1]. Biomechanical preparation was initiated with the Prosper system using manufacturer guidelines along with intermittent irrigation with unbuffered 3% Sodium Hypochlorite (NaOCl) and Normal Saline (NS). After enlarging and preparing the canals with the F2 file, canals were copiously irrigated with approximately 10 mL of NaOCl and saline solution using a 26 gauge needle bent at 45°. During the irrigation of mesiobuccal canal, patient experienced sudden severe pain. Haemorrhage from mesiobuccal canal was observed. Within few minutes, patient developed a fluctuant, shiny swelling extending from the left periorbital area to the corner of the mouth, with the swelling being most prominent in infraorbital region [Table/Fig-2]. The swelling was

soft on palpation and crepitus was also appreciable. Suspecting NaOCl accident, the canals were copiously irrigated with isotonic saline. The tooth was left open for some time under rubber dam isolation to allow the escape of the irritant and constriction of the gases into the periapex.

Patient was administered injection dexamethasone 3.3 mg/mL intravenously and injection diclofenac 2.5 mg/mL intramuscular to control the inflammation and provide pain relief. To prevent the secondary infection, cap. amoxycylav 625 mg was prescribed. Oral steroid in form of 16 mg methylprednisolone in two equal divided doses was also prescribed and the patient was asked to come for follow-up after 24 hours.

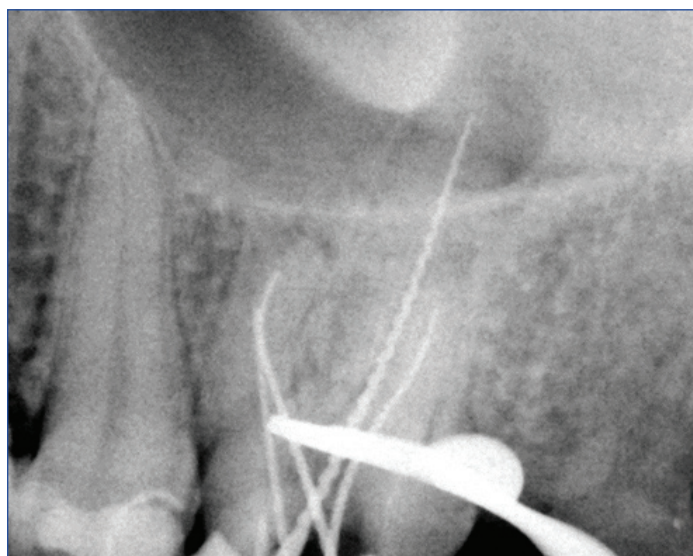
On the second day, patient complained of minor discomfort during chewing, but the swelling decreased and was limited to the left zygomatic region and the upper eye lid [Table/Fig-3]. On intraoral examination, no necrosis or ecchymosis was detected. However, the patient complained of sneezing, nasal irritation and heaviness in left cheek region. Patient was referred to Department of Otorhinolaryngology for a thorough evaluation, where he was prescribed antihistaminic drugs, nasal wash and was asked to continue methylprednisolone. The paranasal X-ray view was unremarkable.

On third day, considerable improvement was noticed and the swelling was just restricted to the infraorbital region. The patient was otherwise asymptomatic. Tapering-off steroid dosage was prescribed. Patient was monitored at recall appointments on the fourth and the fifth day and gradual reduction in infraorbital swelling was observed.

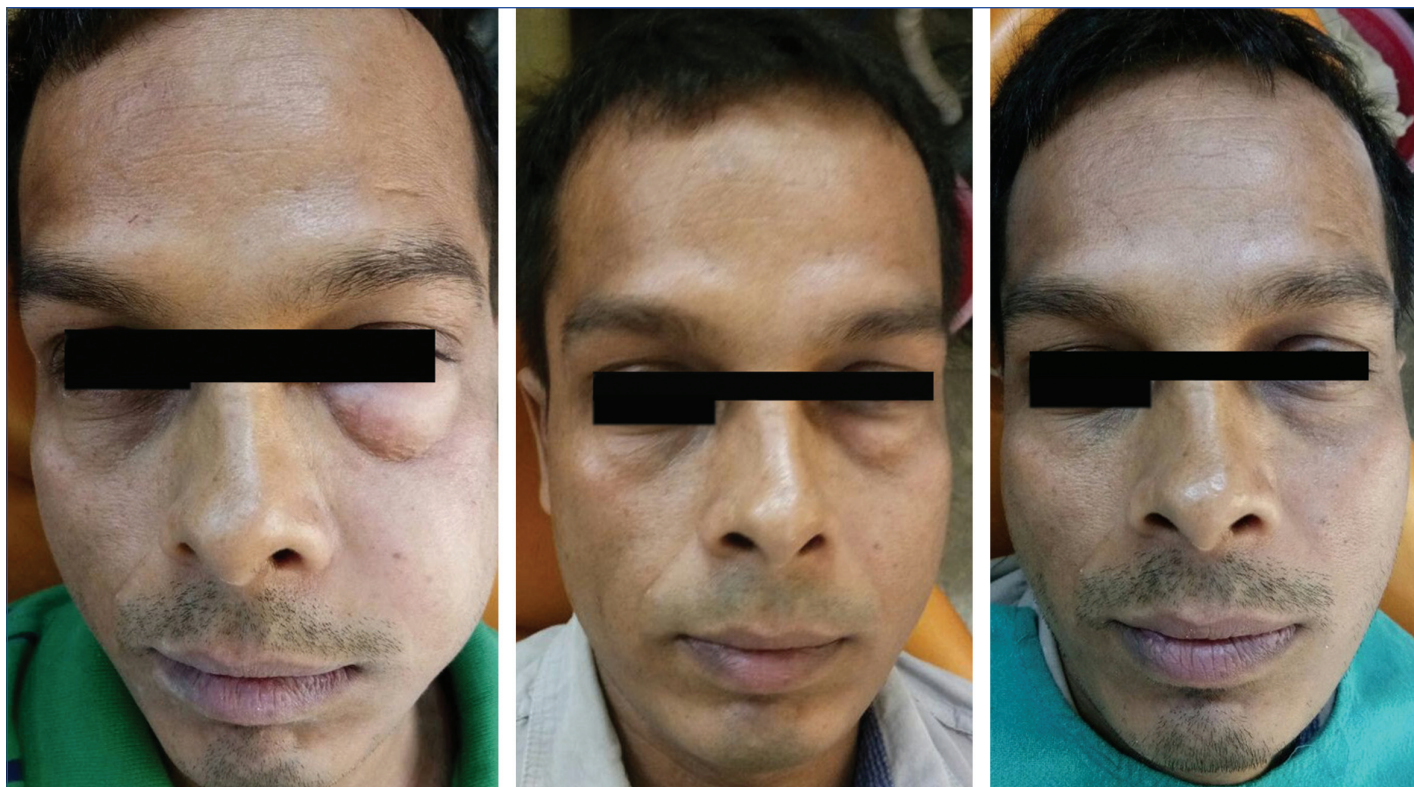
On the tenth day, the swelling completely disappeared and the patient regained his previous facial appearance without evidence of pain, haemorrhage, burning sensation and nerve parenthesis [Table/Fig-4]. Subsequently, the endodontic therapy of the involved teeth was instituted and the canals were obturated with gutta percha upto the working length using lateral condensation technique and restored with composite restoration [Table/Fig-5].

NaOCl accident is an acute emergency condition warranting immediate intervention as it can lead to serious complication, which sometimes can be life-threatening too [1]. In the present case, the mesiobuccal canal was over instrumented by 3 mm, due to a misinterpretation of working length radiograph by the operating dentist, making the foramen size approximately 0.40 mm (assessed during repeat working length X-ray during subsequent visit). It has earlier been reported that such a violated apical constriction highly predisposes the tooth to NaOCl extrusion [2,3]. Another factor which might have contributed to the extrusion could be a high irritant flow rate due to the use of a side beveled open-ended needle [4].

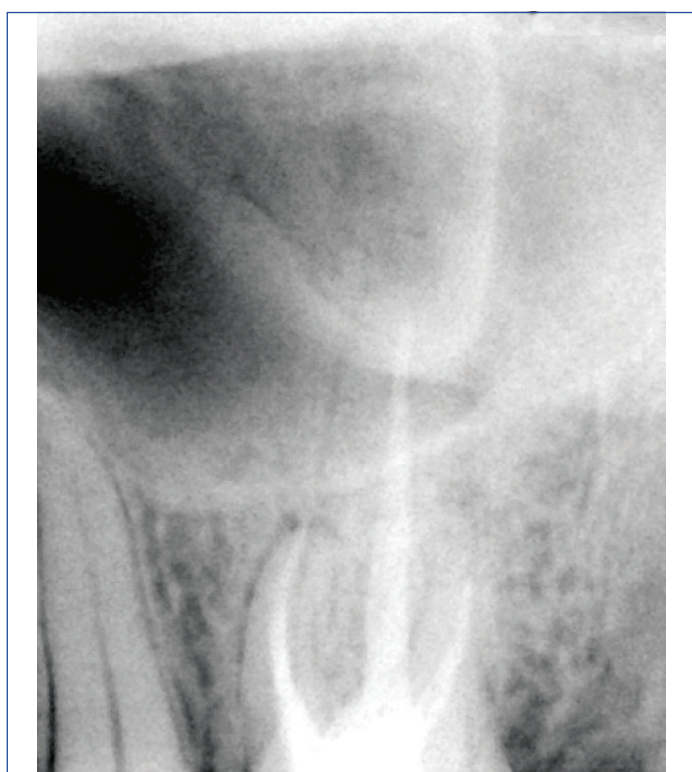
Manifestation of symptoms in the present case included immediate pain, haemorrhage from the canal and immediate swelling extending



[Table/Fig-1]: Working length established and confirmed with intraoral periapical radiograph.



[Table/Fig-2]: Clinical presentation on the day of sodium hypochlorite accident. **[Table/Fig-3]:** Clinical presentation one day after sodium hypochlorite accident. **[Table/Fig-4]:** Clinical presentation ten days after sodium hypochlorite accident. (Images from left to right)



[Table/Fig-5]: Postobturation intraoral periapical radiograph.

up to the infraorbital margin. This triad of clinical signs and symptoms has been a consistent finding in reported cases of hypo accident [2]. Ecchymosis has also been reported as a manifestation of hypo accident in some case reports- most commonly at angle of mouth and periorbital region and in few cases extending to neck and chest as well [5,6]. Oedema can be considered a protective reaction in response to injection of a hyperosmotic and cytotoxic fluid. Ecchymosis, however if present, is a result of dissolution of blood vessel walls due to oxidative action of NaOCl resulting in haemorrhage into surrounding soft tissues [5].

Treatment of NaOCl accident consists of providing palliative care only. Patient should be reassured. Local anesthesia is immediately

administered to provide pain control, if not already administered. Incision and drainage may be required [1]. The role of antibiotics in such cases still lacks scientific evidence, but they are prescribed in most cases, as in present case, to rule out the possibility of secondary infections in necrotised tissues. Steroids are prescribed to reduce inflammatory response [6,7]. Otorhinolaryngology opinion is sometimes required, if maxillary sinus is involved. A regular follow-up is always indicated. In nearly all the cases, there is complete resolution of symptoms within the time period ranging from one week to one month. Prolonged paraesthesia has been rarely featured. Sometimes weakness of the facial musculature has also been found.

Considering the morbidity caused due to sodium hypochlorite extrusion, care must be taken to prevent this occurrence by observing all the precautionary measures. All the dental operators must be taught the management of such an accident and a subsequent referral to a Maxillofacial Surgeon must be made, if required. Use of newer systems like negative pressure irrigation systems should be promoted and where these systems are not available, closed ended side vented needles with stoppers for measurement of insertion depth should be used without wedging and with very slow flow rate. All efforts should be made to keep apical constriction as small as possible. The aim of a safe endodontic treatment should run in parallel with the aim of fast and effective endodontic treatment.

REFERENCES

- [1] Abramson A, Sabag E, Nahlieli O. Surgical approach to a severe case of sodium hypochlorite accident: A case report and review of the literature. *Quintessence Int.* 2021;52(9):806-10.
- [2] Shetty SR, Al-Bayati SAAF, Narayanan A, Hamed MS, Abdemagyd HAE, Shetty P. Sodium hypochlorite accidents in dentistry. A systematic review of published case reports. *Stomatologija.* 2020;22(1):17-22.
- [3] Charara K, Friedman S, Sherman A, Kishen A, Malkhassian G, Khakpour M, et al. Assessment of apical extrusion during root canal irrigation with the Novel GentleWave System in a simulated apical environment. *J Endod.* 2016;42(1):135-39.
- [4] Magni E, Jäggi M, Eggmann F, Weiger R, Connert T. Apical pressures generated by several canal irrigation methods: A laboratory study in a maxillary central incisor with an open apex. *Int Endod J.* 2021;54(10):1937-47. Doi: 10.1111/iej.13575.
- [5] Zhu WC, Gyamfi J, Niu LN, Schoeffel GJ, Liu SY, Santarcangelo F, et al. Anatomy of sodium hypochlorite accidents involving facial ecchymosis- A review. *J Dent.* 2013;41(11):935-48. Doi: 10.1016/j.jdent.2013.08.012.

- [6] Hatton J, Walsh S, Wilson A. Management of the sodium hypochlorite accident: A rare but significant complication of root canal treatment. *BMJ Case Rep.* 2015;2015:bcr2014207480.
- [7] Faras F, Abo-Alhassan F, Sadeq A, Burezq H. Complication of improper management of sodium hypochlorite accident during root canal treatment. *J Int Soc Prev Community Dent.* 2016;6(5):493-96. Doi: 10.4103/2231-0762.192939.

PARTICULARS OF CONTRIBUTORS:

1. Senior Resident, Department of Dentistry, Kalpana Chawla Government Medical College, Karnal, Haryana, India.
2. Associate Professor, Department of Dentistry, Kalpana Chawla Government Medical College, Karnal, Haryana, India.
3. Ex-Senior Resident, Department of Dentistry, Safdarjang Hospital, New Delhi, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Ruchi Juneja,
Associate Professor, Department of Dentistry, Kalpana Chawla Government Medical College, Karnal, Haryana, India.
E-mail: ruchijuneja1986@gmail.com

PLAGIARISM CHECKING METHODS: [\[Jain H et al.\]](#)

- Plagiarism X-checker: Mar 24, 2022
- Manual Googling: May 16, 2022
- iThenticate Software: Jun 03, 2022 (3%)

ETYMOLOGY: Author Origin**AUTHOR DECLARATION:**

- Financial or Other Competing Interests: None
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **Mar 19, 2022**Date of Peer Review: **Apr 15, 2022**Date of Acceptance: **May 23, 2022**Date of Publishing: **Aug 01, 2022**