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CASE REPORT

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Oral chemical ulceration due to iatrogenic hydraulic oil leakage from the dental unit of a surgical handpiece: A case report

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Key Clinical Message

Oral chemical ulceration is a rare condition. The causes differ from misuse of dental material by dentists and over-the-counter drugs (OTC) to the herbal ingredients in our foods. Detailed patient history helps to explore the diagnosis and further management of such a lesion, which extend from no intervention in mild cases to surgical intervention in severe cases. This report represents a case of chemical ulceration of the mouth caused by hydraulic fluid oil leakage inside a dental chair in a 24-year-old female, leading to the patient developing multiple painful oral ulceration after surgical extraction. The purpose of the report is to increase awareness among health practitioners of unusual causes that could happen during dental interventions.

KEYWORDS

burning, chemical, dentistry, handpiece, oral, ulcer

1 | INTRODUCTION

Oral ulceration can emerge from various causes, including thermal, physical, chemical, immunological, and malignant processes. Chemical oral ulceration is comparatively rare; it can occur from the misuse of dental material, over-the-counter dental product ingredients, side effects of drugs, or can be a consequence of suicidal attempts such as ingestion of chemical products.[1] We present a case report for oral chemical ulceration as a result of iatrogenic hydraulic oil leaking from the air unit of a surgical handpiece during surgical tooth extraction.

2 | CASE REPORT

A 24-year-old female was referred to the Oral, Maxillofacial and Diagnostic Sciences Department, Collage of dentistry at Majmaah University, A day after surgical extraction of the lower left first molar at Oral and Maxillofacial Surgery Clinic, Al-Zulfi General Hospital with a chief complaint of developing multiple painful ulcerations in the mouth. Ethical approval was obtained. According to the patient's medical history, she had a surgical extraction of the first lower left molar a day before the lesion developed. During the surgery, as the surgical handpiece is working, the patient experiences a burning sensation on the contralateral

side of the mouth, as this site is not anesthetized. The surgery procedure lasted 44 to 60 min. During that time, patient informs the surgeon but unfortunately the surgeon ignored the symptoms and continued the procedure as there was no patent reason. After 24 h, the patient started to develop multiple painful ulceration in the mouth, making the patient unable to eat or drink.

Her medical and social history is unremarkable. The intraoral examination revealed diffuse painful ulceration affecting most of the oral cavity: the socket of an extracted tooth both mucosa and affected bone, soft palate, buccal mucosa, ventral side of the tongue, the floor of the mouth, and left side of the lower lip (Figures 1,2).

The patient was emotionally compromised, and she does not eat or drink since the lesion started but stated she was on a limited soft diet. The patient was informed and consented to take photographs but refused to insert any instrument in the mouth or hold the mucosa as she could not tolerate the pain. After discussing the case with her surgeon, he found the event was caused by (a faulty solenoid valve) leading to leakage of hydraulic fluid oil into the dental unit air, which was work with water during the procedure. The final diagnosis is oral chemical ulceration induced by iatrogenic hydraulic fluid oil leakage from the dental unit.

The treatment plan given to relieve the inflammation and pain as follows: Topical corticosteroid prednisolone sodium phosphate (Predo® 15 mg/5 mL JPI, Riyadh-Saudi Arabia) as syrup, instruction to keep it in the mouth for at least 3 min and spit it out four times/day for 2 weeks (patient rejected to swallow as she was fasting during Ramadan). Lidocaine hydrochloride B.P (Xylphil® 2% Philadelphia Pharmaceutical Co, Amman-Jordan) as a gel applied every 3 h to control the pain. Follow-up after 2 weeks revealed most of the lesions healed except for partial healing in the floor of the mouth (Figures 3,4); the patient explained as the tongue covers the floor of the mouth, preventing the topical agent from reaching the affected area.

The patient was instructed to continue the topical corticosteroid two times/day for 2 weeks and hold it below the tongue for 1 min, swish and spit for additional 1 min; the patient given recall after 2 weeks. At second follow-up, the visit showed complete resolution of oral, lip ulcers and healing of the involved bone in the socket of extracted tooth with the exceptions of shallow erythematous area on the tip of the tongue (Figure 5). Patient able to eat and

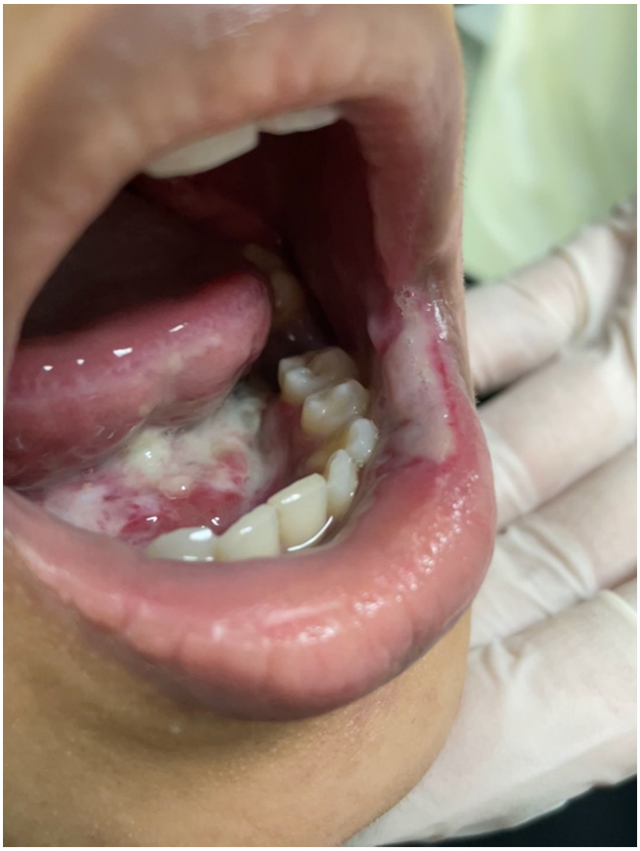

FIGURE 1 Desquamation of the lower lip and floor of the mouth.

FIGURE 2 Ulceration extend to the soft palate.

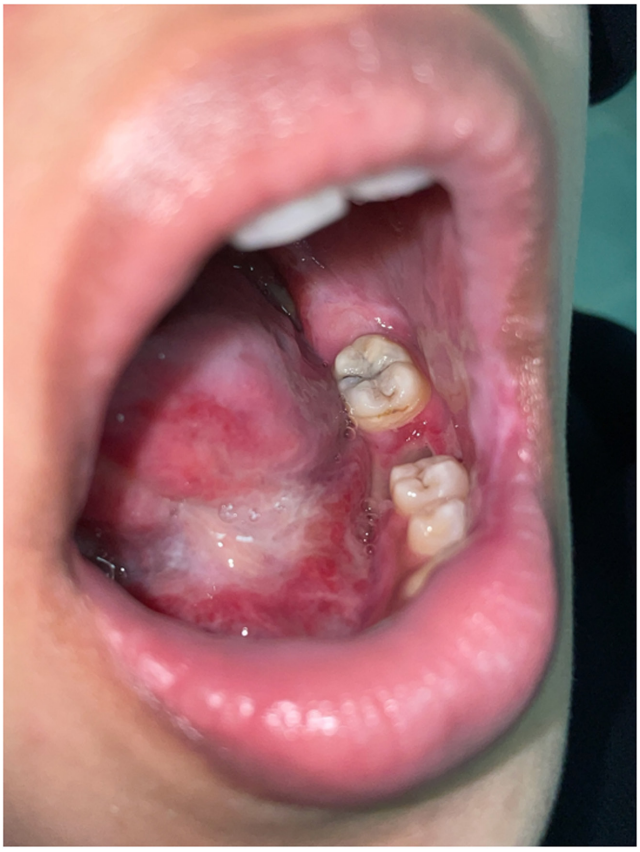

FIGURE 3 Ulceration of the lower lip shows complete healing compared to the floor of the mouth.

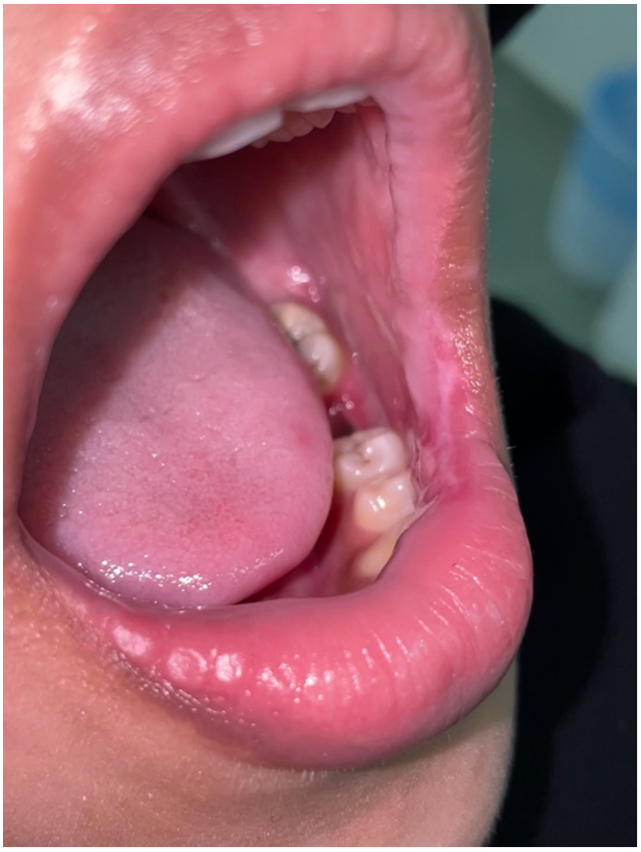

FIGURE 4 The tongue shows complete healing. Note the buccal mucosa still ulcerated.

drink smoothly. Also, during the examination patient agreed to hold the mucosa.

3 | DISCUSSION

This case report represents a patient with oral chemical ulceration causing sloughing of the mucosa as a result of the unanticipated event for leakage of hydraulic fluid oil inside the air of the dental unit where admix with water during surgery. Oral chemical ulceration is mainly reported by iatrogenic trauma caused by dentists from various dental materials such as sodium hypochlorite, Formocresol, or etching material.[2] Also, it is reported that a wide range of over-the-counter dental products such as (chlorohexidine, hydrogen peroxide) mouthwash, and cautery ingredients known as silver nitrate are used for treating aphthous ulcers.[3] The chemical material potentially affects contact oral mucosa due to multiple factors: (1) How the chemical agent works, (2) quantity exposed to the offending tissue, (3)time elapsed of contact tissue, and (4) (PH) strength of this material.[4]

In this case, it clearly happens from unintentional leakage of hydraulic fluid oil in the present faulty solenoid valve, which controls the dental unit during surgical extraction of the lower left first molar tooth leading to exposure to the causative agent. According to the dental chair manufacturer (VIC dental), hydraulic fluid oil is used in the dental chair for operating and changing positions. Hydraulic fluid oil contains hydrotreated spent and solvent ingredients on its compositions and those substance are corrosive and acidic which cause a catastrophic event if contact with the skin and mucosa.[5]

The diagnosis of oral chemical ulceration is based upon careful history taken of the patient and precise clinical presentation.[6] However, the diagnosis can be challenging if a previous history cannot be achieved. In this case, clinical history obtained from the patient likely judged oral chemical ulceration as strongly the final diagnosis. The biopsy is usually not indicated as an additional diagnostic tool with no specific feature for oral chemical ulceration will be revealed.[7] However, excluding other lesions might be helpful if the diagnosis is obscure.[8]

The histopathological finding consists of coagulation necrosis focally in the epithelium, intracellular edema, and altered cell morphology, where underlying connective tissue has a mild inflammation infiltration.[9]

Management of oral chemical ulceration consists of stopping or preventing the offending agent, maintaining the fluid food intake, reducing inflammation, controlling

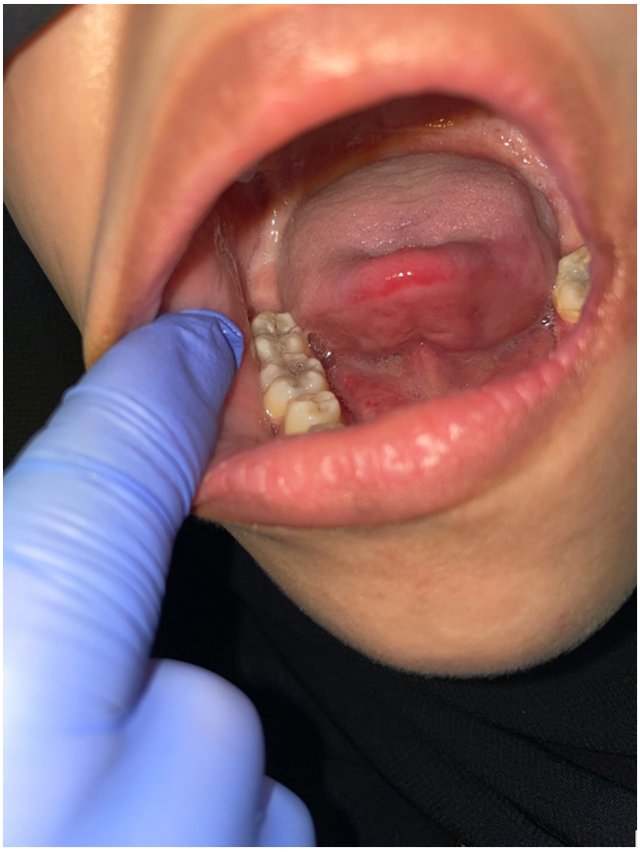

FIGURE 5 Complete healing of the oral cavity except for a slight erythematous area at the tip of tongue.

the pain, and accelerating healing time. In mild-to-moderate cases of oral chemical ulceration, usually, no treatment is required concerning patient reassurance.[10] However, a short course 1 to 2 weeks of topical steroids will reduce the inflammation and help the patient recovery. In our case, we extend the course of treatment due to partial healing in the floor of the mouth for additional time to ensure complete healing.[11] Topical anesthetic, either as gel or rinse, will reduce pain and increase the quality of life. Accelerating healing can also be achieved with hyaluronic acid.[12] A prophylactic antibiotic with surgical debridement is warranted in severe cases of oral chemical ulceration.[13]

4 | CONCLUSION

Oral chemical ulceration requires careful identification and elimination of the cause, as this is might happen during dental treatment. The management of such a lesion range from no intervention in mild cases to extensive surgical decoration in severe form. Although, to our knowledge, no report of a prior example of an oral mucosal chemical ulceration caused by hydraulic fluid leakage from the dental chair exists in the literature.

AUTHOR CONTRIBUTIONS

Khalid A. AL-Hamad: Conceptualization; data curation; formal analysis; investigation; methodology; project administration.

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CONFLICT OF INTEREST STATEMENT

The author declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

ETHICS STATEMENT

Written informed consent was obtained from the patient for their anonymized information to be published in this article.

CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

DATA AVAILABILITY STATEMENT

The data supporting the findings of this study are available within the article.

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REFERENCES

1. Gilvetti C, Porter SR, Fedele S. Traumatic chemical oral ulceration: a case report and review of the literature. *Br Dent J*. 2010;208(7):297-300. doi:10.1038/sj.bdj.2010.295
2. Neville BW, Al E. *Oral and Maxillofacial Pathology*. Elsevier; 2016.
3. Brooks JK. Chemical burn to the gingiva after misuse of an over-the-counter oral whitening mouthwash. *Gen Dent*. 2017;65(1):34-36.
4. Manjunath D, Madhavan S, Pai P. "Tetracycline hydrochloride chemical burn" as self-inflicted mucogingival injury: a rare case report. *J Indian Soc Periodontol*. 2012;16(2):282-285. doi:10.4103/0972-124x.99278
5. Hydraulic VS. Electric dental chair—advantage and disadvantage of each. Leading dental chair manufacturer. *Vic Dental*. 2019; Accessed December 26, 2022 https://ivicdental.com/hydraulic-vs-electric-dental-chair
6. Fitzpatrick SG, Cohen DM, Clark AN. Ulcerated lesions of the Oral mucosa: clinical and histologic review. *Head Neck Pathol*. 2019;13(1):91-102. doi:10.1007/s12105-018-0981-8

7. Mortazavi H, Safi Y, Baharvand M, Rahmani S. Diagnostic features of common Oral ulcerative lesions: an updated decision tree. *Int J Dent*. 2016;2016:1-14. doi:10.1155/2016/7278925
8. McKinney R, Olmo H. *Physical and Chemical Lesions of the Oral Mucosa*. StatPearls; 2022 https://www.ncbi.nlm.nih.gov/books/NBK572079/
9. Kulac M, Aktas C, Tulubas F, et al. The effects of topical treatment with curcumin on burn wound healing in rats. *J Mol Histol*. 2012;44(1):83-90. doi:10.1007/s10735-012-9452-9
10. ung JW, Byun JS, Jung JK, Choi JK. Chemical burns of the oral mucosa caused by Policresulen: report of a case. *J Oral Med Pain*. 2013;38(2):109-114. doi:10.14476/jomp.2013.38.2.109
11. Descroix V, Coudert AE, Vigé A, et al. Efficacy of topical 1% lidocaine in the symptomatic treatment of pain associated with oral mucosal trauma or minor oral aphthous ulcer: a randomized, double-blind, placebo-controlled, parallel-group, single-dose study. *J Orofac Pain*. 2011;25(4):327-332.
12. Casale M, Vella P, Moffa A, et al. Hyaluronic acid and upper airway inflammation in pediatric population: a systematic review. *Int J Pediatr Otorhinolaryngol*. 2016;85:22-26. doi:10.1016/j.ijporl.2016.03.015
13. Mortazavi H, Safi Y, Baharvand M, Jafari S, Anbari F, Rahmani S. Oral white lesions: an updated clinical diagnostic decision tree. *J Dent*. 2019;7(1):15. doi:10.3390/dj701001

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