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Oral Mucosal Ulcers Following Dentine Desensitization Treatment: An Incidental Event or Coincidental Event

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Abstract. Use of dentine desensitization treatment may trigger the release of chemical substances such as acids, alkaline (bases), organic, and non-organic materials which can produce chemical burns manifesting as mucosal ulcers. However, the reported dentine desensitization treatment involved the use of toothpaste as a self-administered agent. This article reported a case of mucosal burn in otherwise healthy 70 year-old male following dentine desensitization treatment using Dentine Desensitizer (Shield Activ). The patient was bothered by the ulcer and requested treatment. Warm saline mouthwash and triamcinolone cream were prescribed. In conclusion, mucosal burn may be considered a potential adverse event following dentine desensitization treatment, after excluding other trigger factors. Authors hereby recommend the following: 1. Employment of adequate precaution geared toward minimizing trauma to the oral mucosa during dentine desensitization treatment among younger practitioners. 2. Inclusion of mucosal ulcers as a complication of dentine desensitization treatment to reduce chances of possible litigation.

Key words: oral mucosal ulcers, dentine desensitization treatment, triggers

Introduction

Trauma to the oral mucosa can be caused by chemical, thermal, physical, electrical, or by radiation which can result in oral ulcerations (Kang et al., 2018; Dayakar et al., 2018; Palao et al., 2010). Oral soft tissue injuries can be inadvertent (accidental or iatrogenic) or deliberate (self-inflicted) (Dayakar et al., 2018; Poswal et al., 2018; Gilvetti, Porter, & Fedele, 2010). Chemical injuries of the oral soft tissues may be caused by exposure to various types of chemical substances such as acids, alkaline (bases), organic, and non-organic materials, which can produce chemical burns (Palao et al., 2010; Akelma & Karahan, 2019). The severity of chemical injury to the oral mucosa also depends on pH, the composition and concentration of the substance, the quantity of the agents, duration of contact with the tissue, the ability to penetrate the tissue, and its mechanism of action (Dayakar et al., 2018; Palao et al., 2010; Hagiwara, Seki, & Takahashi, 2020). Oral mucosal damage can occur due to chemicals or with wide range of dental materials that may contain chemical substances, by unintentional therapeutic errors of patient or dental procedures (Kang et al., 2018; Gilvetti, Porter, & Fedele, 2010; Holmes, Chan, & Singh, 2004). Among dental materials, liquids are more likely to cause oral mucosal ulcer due to difficulty in manipulation during use (Flotra et al., 1971). Unintentional therapeutic error and improper application of medications are two common causes of oral chemical burn (Lai et al., 2005). Chemical injury to the oral mucosa causes pain and discomfort to patients. It may cause vesicle formation followed by ulceration. The ulceration is seen as a bright red area denuded of epithelium and with rough edges which can be felt by the tongue. Healing is rapid, within 1-2 weeks, unless there is secondary infection, especially in debilitated patient. With secondary infection, the wound may suppurate and may be accompanied by lymph gland enlargement and malaise. The most common sites of oral mucosa affected are the labial and buccal mucosae (Elley, Soory, & Manson, 2010; Guerrieri et al., 2019; Koray & Tosun, 2019). Oral mucosal injury from chemical substances is common among children and middle-aged adults and has no gender predilection (McKinney & Olmo, 2021; Nehrlich et al., 2017). The clinical diagnosis of oral mucosal ulcer by chemical substance is based on case-specific history taking, characteristic clinical appearance and location of the

lesion (Elley, Soory, & Manson, 2010). Frequently, the wound heals without active intervention. Patients should avoid irritant foods and drinks. Cold water or warm saline mouth rinse help in relieving pain. Bonjela gel or topical corticosteroid preparation, such as 0.1% triamcinolone may be helpful in cases that are painful and persistent. If there is secondary infection, an antibiotic may need to be prescribed.

Literature review did not reveal any report of oral mucosal ulcers following dental treatment such as dentine desensitisation. We hereby report a case of oral mucosal ulcers as possible complication or coincidental event following dentine desensitisation treatment with dentine desensitizer (Shield Activ) for the management of dentine hypersensitivity.

Case Report

A 70 year old Benin male pensioner presented to the Restorative dental clinic on account of sensitivity to cold drinks and air around the upper left first molar (26) of about one month duration. There was history of chewing on hard foods such as bones. He brushes once daily with a hard bristle tooth brush and fluoride containing dentifrice.

On examination, plaque score was 2.33, calculus score 2.33 and oral hygiene score was 4.66, which was poor oral hygiene status according to the Simplified Oral Hygiene Index. There was generalised inflammation of the gingiva. Upper left first molar (26) was found to be grossly attrited. Periapical radiography revealed mild horizontal bone loss around the upper left first molar (26). A diagnosis of dentine hypersensitivity in a patient with generalised chronic gingivitis was made. Scaling and polishing of all quadrants of the mouth was done using ultrasonic scaler and pumice. Dentine desensitisation using a Dentine Desensitizer (Shield Activ) which contains 2-HdroxyEthylMethacrylate, Sodium Fluoride, Potassium Nitrate and Ethanol was also carried out in 3 courses with one week interval between each course. On each recall visit, multiple reddish, shallow and irregular ulcerations were seen on the left buccal mucosa and the gingival area surrounding tooth 26. The size of the ulcers ranged from 0.3 to 0.5 cm in diameter. A diagnosis of oral mucosal ulcers secondary to chemical injury was made (Figure 1). Patient was reassured that the ulcers would heal. However, by the third recall visit, patient said the ulcers were getting increasingly painful, disturbed his mastication and requested treatment. Patient was counselled on the need to avoid irritant foods and drinks. Warm saline mouth bath was prescribed and oral hygiene instructions were given. 0.1% triamcinolone cream 8 hourly for 1 (one) week was also prescribed and was given 1 week appointment for review. On further review, the oral mucosal chemical burn and dentinal hypersensitivity had resolved and the patient was discharged.

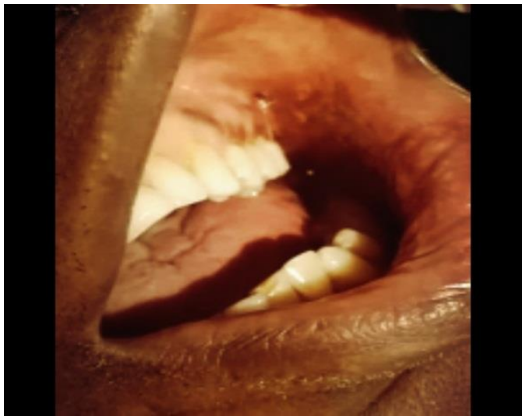

Figure 1

Discussion

Chemical damage to oral mucosa depends on a variety of factors such as the alkalinity or acidity of the material, its concentration, the quantity applied the manner and duration of tissue contact, the extent of penetration into the tissue, and the mechanism of action. In general, the more caustic the agent and the longer the duration of exposure of tissue to the agent, the greater likelihood and extent of tissue damage (Dayakar et al., 2018; Palao et al., 2010; Hagiwara, Seki, & Takahashi, 2020).

Most oral chemical burns are characterized by moderate tissue damage that heals spontaneously within 1-2 weeks without scarring.

The desensitizing liquid containing 2-HdroxyEthylMethacrylate, Sodium Fluoride, Potassium Nitrate and Ethanol has been used for the treatment of hypersensitivity. Potassium ions diffuse along the dentinal tubules and inactivate intra dentinal tubule nerves (Ajcharanukul et al., 2007). 2-HdroxyEthylMethacrylate block the dentinal tubules at the dentine surface from stimuli that cause sensitivity. This prevents excitation of the dentinal tubule nerves and thus relieves hypersensitivity (National Center for Biotechnology Information, 2022). 2-HdroxyethylMethacrylate derives from an ethylene glycol and a methacrylic acid. Low toxicity of 2-HdroxyEthylMethacrylate has been reported after a single exposure to oral tissue (GPS Safety Summary, 2013). We speculate that during the procedure, contact with the oral mucosa by the content of the desensitizing liquid may have caused trauma to the oral mucosal injury unknown to the dentist and imperceptible to the patient. Iatrogenic trauma, which is more common in treatment rendered by young practitioners, has been implicated as a cause of chemical oral injury (Elley, Soory, & Manson, 2010). In this reported case, the clinician was a House Officer.

The scaling and polishing done to treat the chronic gingivitis in this reported case may have also resulted in injury to the oral mucosal by the practitioner, thereby possibly serving as another form of trauma to the oral mucosa. The heat generated during ultrasonic scaling may have cause thermal burn to the oral mucosa. Even the inadvertent contact of the scaling tip with the oral mucosa may also cause some form of mechanical injury. Mechanical, thermal and chemical injuries are among cited causes of trauma to the oral mucosa (Kang et al., 2018; Dayakar et al., 2018; Palao et al., 2010; Elley, Soory, & Manson, 2010). When considering oral mucosal ulcers following use of dental materials that contain chemical substances, it is therefore important to exclude mechanical and thermal injuries. The history, clinical presentations are sufficient to diagnose oral burns and rarely require biopsy. The diagnosis in this report was based strictly on the history and clinical findings and no further investigation was done, which may be an obvious limitation.

It has been stated that chemical oral mucosal burn is common among children and young adults and has no gender predilection (McKinney & Olmo, 2021). In this case report, the patient is a 70 year old male.

Conclusion

Oral mucosal burn may be considered a potential adverse event following dentine desensitization treatment, after excluding other possible causes. Authors hereby recommend the following:

1. Employment of adequate precaution geared toward minimizing trauma to the oral mucosa during dentine desensitization treatment among younger practitioners.

2. Inclusion of oral mucosal ulcers as a complication of dentine desensitization treatment to reduce chances of possible litigation.

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