

Original Research

# Delayed Healing of Traumatic Ulcers Due to Toothpicks Injuries Exacerbated by Psychological Stress in Teledentistry Patients: Case Report



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Article Info	Abstract
Article history: Received: 9 July 2024 Accepted: 23 September 2024	<p><b>Introduction:</b> A traumatic ulcer is a mucosal lesion caused by direct physical, mechanical, thermal, or chemical trauma to the mucosa, such as from malocclusion, ill-fitting dentures, or bad habits like using toothpicks. Treatment aims to alleviate pain, eliminate the primary source of trauma, and promote healing of the ulcer. The objective of this case report is to document traumatic ulcers resulting from mechanical trauma exacerbated by stress.</p>
Keywords: Aloe vera extract, stress, teledentistry, tongue lesion, traumatic ulcer	<p><b>Methods:</b> A male patient presented with an ulcer that had been present for three weeks after accidentally injuring himself with a toothpick. The ulcer had not been treated previously. The patient reported experiencing high levels of stress and sleep deprivation due to working on his thesis. Clinical photos provided by the patient revealed a solitary, white-to-yellowish ulcer, approximately 5x3 mm in size, on the left lateral side of the tongue. The patient was prescribed an antiseptic anti-inflammatory aloe vera extract gel via teledentistry.</p> <p><b>Results:</b> Under stress, the HPA axis releases corticotropin-releasing hormone (CRH) from the hypothalamus, activating the adrenal cortex to release glucocorticoids. The interaction between glucocorticoids and proinflammatory cytokines is a physiological mechanism that links stress and wound healing. Glucocorticoids can interfere with the inflammatory response and reduce white blood cell activity, thereby affecting wound healing.</p> <p><b>Conclusion:</b> Traumatic ulcers can be exacerbated by psychological conditions such as stress. Dentists and healthcare providers should conduct thorough patient history assessments, clinical examinations, and provide appropriate therapy and oral health education to promote effective ulcer healing.</p>

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## INTRODUCTION

Traumatic ulcers are common lesions that occur in the oral mucosa. The etiology of traumatic ulcers can be attributed to chemical trauma, heat, mechanical pressure, sharp tooth trauma, or unstable dentures. The incidence rate of traumatic ulcers in Indonesia is considered high, reaching 93.3% [1].

Traumatic ulcers can affect individuals of all ages and genders, with the most common locations being the cheeks (42%), lips (9%), and lateral tongue (25%) [2-4]. The clinical presentation of traumatic ulcers typically involves solitary ulcers with varying shapes, depending on the triggering factors. Pharmacological treatment generally involves formulations containing polyvinylpyrrolidone (PVP), which functions to create a protective layer to prevent irritation and reduce pain. However, PVP can cause hypersensitivity reactions in some cases [5].

Although traumatic ulcers often heal within 1-3 weeks without treatment [6], certain factors can exacerbate or impede the healing process, such as smoking, repeated pressure from dentures, sharp restorations, and psychological conditions like stress [6].

Stress is a psychosocial condition resulting from environmental stimuli that can induce changes in the body's immune system by activating the hypothalamus-pituitary-adrenal (HPA) axis. This axis releases hormones such as corticotropin-releasing hormone (CRH) from the hypothalamus and cortisol from the adrenal cortex [7,8], which

can influence the healing process of ulcers in the oral cavity [9,10].

This paper aims to report a case of a traumatic ulcer caused by mechanical trauma and exacerbated by psychological stress. This case provides insights for healthcare professionals on managing traumatic ulcers with exacerbating factors, aiding in treatment and patient education for recovery.

## CASE REPORT

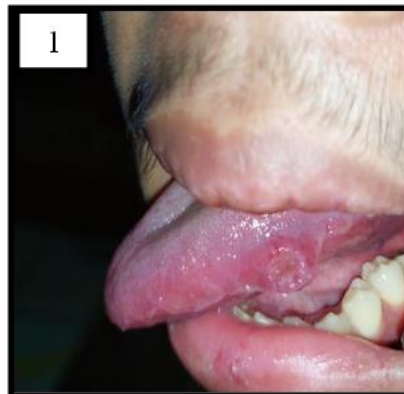
A 20-year-old male student sought a teledentistry consultation due to a mouth ulcer he had been experiencing for three weeks. The ulcer initially developed after accidentally injuring himself with a toothpick while cleaning food residues from his mouth. The patient reported that the ulcer was painful when eating and felt better when consuming cold beverages. He had not received any treatment for the ulcer and mentioned a previous occurrence of a mouth ulcer three months ago, located on the lower lip, caused by poking himself with a toothbrush. The patient typically experiences mouth ulcers 1-2 times a year. This time, the ulcer had not healed in over three weeks, despite his expectation that it would resolve within 7-10 days without treatment.

Medical History: The patient has a history of systemic diseases, including gastritis and a fish allergy. He also has a history of typhoid and dengue fever, with the last occurrence in 2016. He smokes one pack of cigarettes daily and frequently peels the dry skin on his lips. He brushes his teeth once a day and rarely uses mouthwash.

Current Lifestyle: The patient is a senior university student working on his thesis, leading to sleep deprivation and stress.

Based on the clinical photos provided by the patient, there was a solitary ulcer on the left lateral side of the tongue, measuring

approximately 5 x 3 mm, with a white-to-yellowish center and surrounding redness (Fig. 1). A provisional diagnosis of "traumatic ulcer" due to mechanical trauma exacerbated by stress was made.



**Fig. 1.** Initial clinical photo showing a solitary ulcer, 5x3 mm, on the left lateral side of the tongue.



**Fig. 2.** Clinical photo on Day 5 showing reduced ulcer size but persistent



**Fig. 3.** Clinical photo on Day 10 showing complete healing of the ulcer.

The patient was advised to undergo a complete blood count (CBC) test, but he declined. He was prescribed an antiseptic anti-inflammatory aloe vera gel and instructed to avoid toothpicks, spicy foods, and hot beverages while ensuring adequate rest and stress management.

At the Day 5 follow-up (Fig. 2), the patient reported that the ulcer was no longer painful, though some redness remained. He had discontinued using toothpicks but found it challenging to avoid staying up late. The patient was advised to continue using the prescribed medication and prioritize sleep for overall healing.

During the final consultation on Day 10 (Fig. 3), the patient reported that the ulcer had healed completely and that he had managed his stress by playing games and engaging in futsal. He was advised to continue using antiseptic mouthwash and was educated on stress management, proper diet, and rest to support his overall well-being.

A one-month evaluation via teledentistry revealed that the patient no longer had complaints of mouth ulcers. He had stopped

using toothpicks and successfully managed his stress. The final diagnosis was a "traumatic ulcer exacerbated by psychological stress." This case highlights the importance of a holistic approach that includes medical treatment, lifestyle changes, and stress management to promote healing and prevent the recurrence of mouth ulcers.

## DISCUSSION

Under normal circumstances, mouth ulcers typically heal within 10-14 days once the causative factors are removed [11]. However, psychological stress can disrupt this process [12], as it can reduce immune function and delay healing [13]. Patients experiencing post-operative stress tend to have lower concentrations of IL-1 $\beta$  [14-16].

Additionally, studies conducted on stressed mice have shown lower levels of IL-1 $\beta$  in the wound area compared to the control group. In stressful conditions, the activation of the Hypothalamus-Pituitary-Adrenal Cortex (HPA) axis results in the release of Corticotropin-releasing hormone (CRH) from the hypothalamus, which, in turn, activates

the adrenal cortex to release glucocorticoids. The interaction between glucocorticoids and proinflammatory cytokines represents a physiological mechanism connecting stress and the wound-healing process. Increased glucocorticoids can impact the inflammation process in wound healing. This is because cortisol can reduce the accumulation of white blood cells, which play a crucial role in the wound healing process and defense against infections. [17]

In the case described above, the patient was prescribed aloe vera gel extract, which they used four times daily. Aloe vera contains compounds such as flavonoids, saponins, sterols, and terpenoids that function as antiseptic anti-inflammatories. These aloe vera compounds can inhibit prostaglandin E2 and interleukin-8 (IL-8) formation, thus serving as antiseptics. As an anti-inflammatory agent, aloe vera contains amino acids like phenylalanine and tryptophan, which prevent the formation of prostaglandins from arachidonic acid, reducing the vasodilation phase and the vascular effects of histamine, serotonin, and inflammatory mediators [18,19].

Furthermore, aloe vera aids in expediting the wound-healing process. The increased production of immunomodulators such as compounds like TGF- $\beta$ -1 and bFGF evidences this [19]. Aloe vera extract accelerates the wound-healing process by promoting angiogenesis and the formation of new blood vessels, thereby increasing the oxygen supply in the wound area. Polysaccharides in aloe vera demonstrate activation of macrophage cells, which can enhance the healing process [20,21].

The patient was also instructed to take a multivitamin supplement containing a combination of B-complex vitamins, Vitamin C at 750 mg, Vitamin E at 30 IU, folic acid at 400 mcg, pantothenic acid at 20 mg, Zinc at 22.5 mg, and niacin at 100 mg. The B-complex vitamins assist in protein and glycogen metabolism, while Vitamin C and E act as antioxidants, supporting the immune system and accelerating the wound healing process [22]. Folic acid plays a crucial role in the formation of red blood cells and facilitates the regeneration of damaged tissues. [23].

The limitation of this case is that teledentistry patients are challenging to monitor directly regarding medication use and clinical examinations, which results in limited data and less detailed photos sent.

## CONCLUSION

Traumatic ulcers typically heal within 7-14 days once the causative factors of the trauma are removed. However, conditions like psychological stress can affect the wound healing process. Stress management is crucial to support the healing of mouth ulcers. Dentists and health care providers should assess proper patient history, clinical examination, appropriate therapy, and oral health education to promote effective healing. Teledentistry can be an effective tool for patients limited by distance and time, enabling doctors to monitor their conditions regularly through photos sent by patients, thereby enhancing ongoing care. This research proves that teledentistry can be used for oral lesions-induced stress. Additionally, treating oral ulcers using antiseptic anti-

inflammatory aloe vera extract gel through teledentistry is good.

#### ACKNOWLEDGMENT

Thank you for the patient cooperation and consent to be involved in this research.

#### FUNDING

No funding was received for this research.

#### CONFLICT OF INTEREST

The researchers declare that there is no conflict of interest.

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