Treatment of traumatic ulcer induced by fixed orthodontic appliance: a case report

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ABSTRACT Orthodontic treatment aims to improve the oral health of the patient. Still, orthodontic treatment can also cause problems in the oral cavity, such as the appearance of traumatic ulcers caused by the use of orthodontic appliances. The following describes a chronic traumatic ulcer in a patient using fixed orthodontic appliances. Case Report: A female patient aged 22 years complained of thrush after using braces. Clinical examination revealed a single ulcerated lesion on the right buccal mucosa of the upper molar region adjacent to the buccal tube of the orthodontic appliance. The patient was then treated with topical corticosteroids and chlorhexidine gluconate. The patient was also consulted by an orthodontic specialist for further treatment using orthodontic wax to help protect against friction between the wires and the mucosa. The lesions healed on the third visit. Orthodontic treatment often causes injuries to the oral mucosa. It is because the orthodontic appliances used can rub against the oral mucosa so that they are very susceptible to causing traumatic ulcers. Traumatic ulcers arising from orthodontic treatment are generally chronic, requiring comprehensive treatment to reduce patient complaints. Conclusion: Treatment of chronic traumatic ulcers due to the use of fixed orthodontic appliances should be carried out comprehensively by involving an oral medicine specialist and an orthodontist to provide maximum treatment for traumatic ulcers and reduce patient complaints.

KEYWORDS: Traumatic Ulcer, Orthodontic Appliance, Treatment

INTRODUCTION

Orthodontic treatment aims to improve oral health, function, appearance, and patient confidence. However, orthodontic treatment has risks and complications for soft and hard tissues like other treatments. Soft tissue irritation can occur indirectly due to allergies to orthodontic appliance materials or directly from components of fixed and removable orthodontic appliances. Fixed orthodontic appliances consist of brackets, wires, bands, tubes, hooks, and other elements that can rub against the mucosa. Irritation caused by orthodontic appliances is called traumatic ulceration.

Traumatic ulceration is a soft tissue lesion of the mouth caused by acute or chronic physical, mechanical, thermal, or chemical trauma. Clinically, the lesion is an ulcer covered by a yellowish-white fibrinopurulent layer and surrounded by erythematous areas and hyperkeratotic tissue. Treatment for traumatic ulcers caused by orthodontic treatment can be done in various ways and comprehensively by involving orthodontists and oral medicine specialists. In this case report, we describe the treatment of a case of chronic traumatic ulcer triggered by the use of fixed orthodontic braces.

CASE REPORT

A 21-year-old female patient came to the Dental and Oral Hospital, Faculty of Dentistry, Syiah Kuala University, complaining of thrush in the mouth seven days ago. At first, the thrush was small but grew bigger and caused pain when eating and talking on the VAS 7 scale. The thrush had never
been treated, and the patient said that the initial appearance of thrush was due to braces. The history of repeated thrush was denied, and the family history of canker sores was also rejected. Extraoral examination, lymph nodes were not abnormal, and intra-oral examination revealed a nodule accompanied by irregular ulceration with a size of 4x2 mm on the right buccal mucosa of region 17 (Figure 1) adjacent to the central Stensen duct.

![Figure 1. First visit, ulcerative lesion on right buccal mucosa](image)

The patient denied any systemic disease and had a history of allergies. At visit 1, the patient was given a topical corticosteroid on the lesion and educated to visit an orthodontist. On the second visit, one week after the first visit, thrush still exists in the oral cavity, and the pain is slightly reduced. Clinical examination, the nodule was still visible with ulceration in the healing process, oval in shape, the same color as the surrounding tissue, in front of the white nodule, measuring 4x2 mm, getting smaller back 4x1 mm with ulcer 1x1 mm, location on the right buccal mucosa near tooth 17, well-defined, symptomatic. (Figure 2) at the second visit, treatment was supplemented by administration of 0.2% Chlorhexidine gluconate, compressed twice a day after meals, and using ortho wax to cover the sharp ends of orthodontic wires.

![Figure 2. On the second visit, the ulcer has not shown significant changes](image)

On the 3rd visit, two weeks after the second visit, the patient stated that the healing of thrush was getting better, and the pain was no longer a complaint. Clinical examination showed complete ulcer healing. At this visit, the patient was instructed to discontinue topical medications and continue using orthodontic waxes. (Figure 3).
DISCUSSION

Traumatic ulcers can be caused by physical, thermal, or chemical trauma. This traumatic ulcer is a prevalent lesion found in daily practice. Accidentally biting while eating sharp food causes an acute traumatic ulcer that can heal in a few days without complications. A traumatic ulcer caused by sharp tooth edges, poor restoration, ill-fitting dentures, and fixed orthodontic appliances can cause chronic traumatic ulcers.

Chronic traumatic ulcers commonly occur on the lateral margin of the tongue, buccal mucosa, and lips. Clinically, chronic traumatic ulcers are seen as superficial or deep solitary lesions accompanied by varying degrees of loss of integrity of the epithelial layer, the base of the ulcer being covered by a yellowish-white fibrin layer. Ulcers caused by repeated trauma may be symptomatic or asymptomatic, often showing a high margin and firm on palpation. When the cause of the trauma is removed, the lesion can heal with or without scarring.

Oral mucosal lesions associated with orthodontic appliances are caused by trauma, infection, or reactivity. Traumatic pathologies cause various clinical forms of lesions depending on the type of orthodontic appliance used. Brackets are associated with the appearance of erosive and keratotic areas caused by friction on the adjacent mucosa. Arches are often associated with ulcers caused by hooks piercing the oral mucosa. The mini screw is often associated with erythema and erosion.6,7,8

In this case report, an ulcerated lesion occurred in a patient using fixed orthodontic appliances. Orthodontic treatment can increase the risk of soft tissue irritation due to fixed or removable appliance components.9 Ulceration is one of the most common problems experienced by most patients undergoing fixed orthodontic treatment. Previous studies showed that 75.8% of fixed orthodontic appliance wearers had minor ulcerations, and 2.5% had severe ulcerations.9,10

Fixed orthodontic appliance components irritate brackets, bracket hooks, bands, tubes, lingual arches, trans-palatal arch, and wires, especially the distal part of the wire.3,4 Irritation of the mucosa occurs due to friction between the mucosa and the components of the orthodontic appliance.4 Unpredictable movements of the cheek and tongue muscles can also exacerbate ulceration. Brackets can cause erosion and desquamation of the mucosa, whereas wires can cause ulceration.11,12

The epithelium damaged by the lesion exposes nerve endings to the sensation of pain. Previous studies have focused more on pain caused by tooth movement than the pain caused by lesions.12 Characteristics of mucosal pain are stinging, stinging, or burning, and patients can usually pinpoint the cause of the pain.13

The location of ulcers caused by the use of orthodontic appliances is the buccal and vestibular mucosa. In a study by Gupta et al., as many as 56.6% of traumatic ulcer lesions were found on the buccal mucosa. Research conducted by Baricevic et al. and Travess et al. stated that ulcers that occur in patients using fixed orthodontic appliances are caused by friction of the archwire and bond or wire resting on the mucosa.4,14

Treatment of traumatic ulceration consists of preventive and definitive therapy.15 Treatments commonly used in traumatic ulcer lesions caused by fixed orthodontic appliances are chlorhexidine gluconate (CHx), topical corticosteroids, hyaluronic acid, and orthodontic wax used as an interceptive element.16 The easiest way to treat traumatic ulcerations is to identify and eliminate the cause. In fixed orthodontic treatment, it is not possible to remove the bracket. Therefore, a barrier is made between the source of irritation...
and the adjacent mucosa to reduce friction. Orthodontists commonly use waxes without medication to cover frames or other components that cause ulceration.\textsuperscript{13,15} Research has shown that waxes containing benzocaine are more effective at reducing pain than waxes without medication.\textsuperscript{13}

**CONCLUSION**

Orthodontic treatment can cause traumatic ulcers anywhere in the oral cavity. Traumatic ulcers caused by orthodontic appliances are chronic, so healing takes longer. Treatment for traumatic ulcers is carried out comprehensively by involving an orthodontist and an oral medicine specialist to produce a more optimal treatment.

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