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Addressing mucosal ulcers during orthodontic treatment: An urgent call for preventive strategies

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Abstract

Mucosal ulcers are a common yet often overlooked complication during orthodontic treatment, significantly impacting patient comfort and compliance. This letter aims to highlight the prevalence, potential causes, and management strategies for mucosal ulcers in orthodontic patients. By reviewing recent literature and clinical observations, we underscore the necessity for proactive measures and tailored interventions to mitigate the incidence and severity of these lesions. Emphasizing the role of patient education and the use of protective devices, we call for a multidisciplinary approach to enhance patient care and treatment outcomes. This discussion is particularly relevant in the context of evolving orthodontic techniques and materials, which necessitate continuous adaptation of clinical practices to ensure patient safety and well-being.

Key Words: Mucosal ulcers; Orthodontic treatment; Patient comfort; Preventive strategies; Clinical management; Protective devices

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Core Tip: This letter addresses the critical issue of mucosal ulcers during orthodontic treatment, emphasizing their impact on patient comfort and treatment outcomes. It offers insights into preventive measures and management strategies, highlighting the need for heightened awareness and proactive care in orthodontic practices to mitigate these complications and improve patient experiences.

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TO THE EDITOR

We have read with great interest the recent article by Chang and Li[1], entitled Multivariate Analysis of Oral Mucosal Ulcers During Orthodontic Treatment, and we would like to provide some important considerations regarding this topic. Mucosal ulcers are a common and often painful complication experienced by patients undergoing orthodontic treatment. These lesions can cause significant discomfort, impact oral health, and interfere with treatment compliance. The prevalence of mucosal ulcers in orthodontic patients highlights the need for increased awareness and improved management strategies among dental professionals[2,3].

The purpose of this letter is to discuss the etiology, impact, and management of mucosal ulcers during orthodontic treatment. By sharing clinical observations, contributing factors, and recent research developments, we aim to provide insights that can enhance patient care and outcomes. Additionally, we hope to encourage further research and innovation in this area to better support orthodontic patients.

CLINICAL OBSERVATIONS

Mucosal ulcers, also known as aphthous ulcers or canker sores, typically present as small, round or oval lesions with a white or yellowish center and an erythematous halo. These ulcers can occur on the inner lips, cheeks, tongue, floor of the mouth, and soft palate. In patients undergoing orthodontic treatment, the ulcers are often caused by mechanical irritation from braces, wires, and other orthodontic appliances. Symptoms include localized pain, burning, and tenderness, which can be exacerbated by eating, speaking, and maintaining oral hygiene[1-3].

Incidence and prevalence

The incidence of mucosal ulcers in orthodontic patients varies, but studies suggest that a significant proportion of individuals undergoing treatment experience these lesions. Research indicates that approximately 51%-63% of orthodontic patients develop mucosal ulcers at some point during their treatment[1,2]. The prevalence may be higher in certain populations, particularly in patients with poor oral hygiene or those with a history of recurrent aphthous stomatitis[3-5]. These statistics underscore the importance of recognizing and addressing mucosal ulcers as a common issue in orthodontic care.

Patient impact

Mucosal ulcers can have a substantial impact on the quality of life of orthodontic patients. The pain and discomfort associated with these lesions can lead to difficulty in eating, speaking, and performing routine oral hygiene practices. This discomfort can also result in reduced treatment compliance, as patients may be less willing to wear their appliances or follow their orthodontist's instructions. Additionally, the presence of ulcers can lead to secondary complications such as infections and nutritional deficiencies if the pain interferes with proper dietary intake[1,3,5]. Therefore, effective management of mucosal ulcers is crucial to ensuring patient comfort and the success of orthodontic treatment.

CAUSES AND CONTRIBUTING FACTORS

Mechanical irritation

One of the primary causes of mucosal ulcers in orthodontic patients is mechanical irritation. Orthodontic appliances such as braces, wires, brackets, and bands can rub against the soft tissues of the mouth, leading to friction and trauma. This constant mechanical irritation can break down the mucosal barrier, resulting in ulceration[2,4]. Adjustments and tightening of orthodontic appliances can exacerbate this irritation, increasing the likelihood of ulcer formation. The sharp edges of brackets and the ends of wires are common culprits, often requiring intervention with orthodontic wax or appliance adjustments to minimize discomfort[5-7].

Oral hygiene

Oral hygiene practices play a significant role in the development and management of mucosal ulcers. Poor oral hygiene can lead to the accumulation of plaque and food particles around orthodontic appliances, creating an environment conducive to bacterial growth and inflammation. This can increase the susceptibility of the mucosa to ulceration[2,8,9]. Conversely, maintaining good oral hygiene by thoroughly cleaning around braces and wires can help reduce the risk of ulcers. Patients are often advised to use specialized orthodontic brushes, interdental cleaners, and antimicrobial mouth rinses to enhance their oral hygiene and prevent mucosal injuries[2,5,8].

Several other factors can contribute to the development of mucosal ulcers in orthodontic patients:

Diet: Certain foods, especially those that are acidic, spicy, or abrasive, can irritate the mucosa and contribute to ulcer formation. Patients are often advised to avoid such foods to reduce the risk of ulcers[1,2,6].

Stress: Psychological stress has been associated with the onset and exacerbation of mucosal ulcers. Stress can affect the immune system, making the mucosa more vulnerable to injury and delaying healing[2,5,7].

Individual susceptibility: Some individuals are inherently more prone to developing mucosal ulcers due to genetic factors, immune response variations, or a history of recurrent aphthous stomatitis. These patients may require additional preventive measures and targeted treatments[2,4,8].

Systemic conditions: Underlying health conditions such as nutritional deficiencies (*e.g.*, vitamin B12, folate, iron), hormonal changes, and gastrointestinal disorders can predispose patients to mucosal ulcers. Identifying and addressing these conditions is important in managing ulceration effectively[2,3,7].

By understanding the multifaceted causes and contributing factors of mucosal ulcers, orthodontic professionals can implement comprehensive strategies to prevent and manage these lesions, thereby improving patient comfort and treatment outcomes.

MANAGEMENT AND PREVENTION

Preventive measures

Preventing mucosal ulcers in orthodontic patients involves a combination of mechanical adjustments, protective measures, and meticulous oral hygiene:

Orthodontic wax: Patients should be advised to use orthodontic wax on braces and wires that cause irritation. The wax acts as a barrier, reducing friction and preventing ulcers from forming[2,6,7].

Adjusting appliances: Regular adjustments by the orthodontist can help minimize sharp edges and protruding wires that contribute to mucosal trauma. Ensuring that appliances fit well and are not overly tight can also reduce irritation[7, 10].

Oral hygiene: Emphasizing the importance of maintaining excellent oral hygiene is crucial. Patients should be instructed to use orthodontic-specific toothbrushes, interdental brushes, and antimicrobial mouth rinses to keep their mouths clean and reduce the risk of infection and inflammation[2,7,8].

Dietary modifications: Advising patients to avoid foods that are acidic, spicy, or abrasive can help prevent irritation of the mucosa. Encouraging a balanced diet that supports overall oral health is also beneficial[2,8].

Treatment options

Managing existing mucosal ulcers involves alleviating pain, promoting healing, and preventing secondary infections:

Topical treatments: Applying topical anesthetics (*e.g.*, benzocaine) can provide pain relief. Protective barriers such as gels and pastes can shield the ulcerated area from further irritation. Antiseptic mouthwashes containing chlorhexidine can help prevent secondary infections[2,5,6].

Oral rinses: Patients can use saline rinses or baking soda rinses to soothe the ulcerated area and maintain oral hygiene. These rinses help reduce inflammation and promote healing[2,4,9].

Systemic medications: In cases of severe or persistent ulcers, systemic medications such as corticosteroids or immunomodulatory agents may be prescribed. These medications help reduce inflammation and enhance the healing process. Nutritional supplements (*e.g.*, vitamins B12, folate, iron) may also be recommended if deficiencies are identified[11,12].

Patient education

Educating patients about mucosal ulcers is a key component of effective management. Implementing effective patient education strategies can empower patients to take an active role in their care, thereby improving outcomes.

Recognizing early signs: Patients should be taught to recognize early signs of mucosal ulcers, such as localized pain, burning, and the appearance of small lesions[2,5,6]. This can be achieved through visual aids like diagrams or photos during consultations and reinforced with educational brochures or digital content. Providing patients with a checklist of symptoms to monitor can also enhance early identification.

Seeking timely intervention: Emphasize the importance of seeking professional advice as soon as symptoms arise. This message can be reinforced through follow-up reminders *via* phone calls, text messages, or mobile health apps that encourage prompt communication with the orthodontic team. Creating a clear protocol for patients on how to report symptoms and what to expect during a follow-up can facilitate timely intervention.

Self-care techniques: Provide patients with self-care techniques, such as using orthodontic wax, performing saline rinses, and avoiding irritants[2,7]. To enhance effectiveness, demonstrate these techniques during appointments and provide step-by-step written instructions or video tutorials accessible *via* a clinic's website or patient portal. Patients should also be encouraged to keep a self-care kit at home with necessary supplies, which can be provided as part of the treatment package.

Ongoing communication: Encourage open communication between patients and their orthodontic team. Regular check-ups and consultations provide opportunities to address any issues early and adjust treatment plans as needed. Establishing a patient education session at the beginning of treatment and scheduling periodic reviews can reinforce this communication. Additionally, utilizing digital platforms for virtual check-ins or quick consultations can ensure continuous support, especially for patients who may struggle to visit the clinic frequently.

Interactive patient education programs: Consider integrating interactive patient education programs, which can be delivered through online platforms or mobile apps. These programs could include quizzes, interactive symptom checkers, and progress trackers that motivate patients to stay engaged in their care. Additionally, gamification elements—such as rewarding patients with points or badges for completing educational modules—can enhance patient participation and retention of information.

Multidisciplinary collaboration: Encourage collaboration between orthodontists, dental hygienists, and other healthcare providers to create a comprehensive patient education plan. This can involve cross-training staff to reinforce key messages during different stages of treatment and ensuring consistent communication across all points of care. Implementing multidisciplinary team meetings to discuss and refine patient education strategies can further improve the effi-

cacy of these initiatives.

By incorporating these detailed strategies, orthodontic professionals can effectively educate patients, leading to a significant reduction in the incidence and severity of mucosal ulcers. This proactive approach not only enhances patient comfort and compliance but also contributes to the overall success of orthodontic treatment.

INNOVATIVE APPROACHES

Recent advancements in technology and innovative approaches have shown promise in reducing the incidence and severity of mucosal ulcers in orthodontic patients:

Laser therapy: Low-level laser therapy (LLLT) has emerged as a promising treatment for mucosal ulcers. Studies have demonstrated that LLLT can accelerate healing, reduce pain, and decrease the frequency of ulcer recurrence by promoting cellular repair and reducing inflammation[13].

Biocompatible materials: The development of biocompatible orthodontic materials, such as nickel-free and hypoallergenic brackets and wires, has reduced the incidence of allergic reactions and mechanical irritation, thereby decreasing the risk of mucosal ulcers[14-16].

3D printing and custom appliances: The use of 3D printing technology to create custom orthodontic appliances tailored to the patient's anatomy has shown potential in minimizing irritation and improving comfort. Custom appliances fit more precisely, reducing friction and the likelihood of ulcer formation[17,18].

Saliva substitutes and coating agents: Innovative saliva substitutes and mucosal coating agents have been developed to provide a protective barrier over ulcerated areas, promoting healing and reducing discomfort[19-21]. These products can be particularly beneficial for patients with dry mouth or other conditions that compromise mucosal integrity.

Probiotics: Emerging research suggests that probiotics may play a role in maintaining oral health and preventing mucosal ulcers. Probiotics can help balance the oral microbiome, reducing inflammation and enhancing the mucosal barrier function[22,23].

By staying informed about these recent research findings and innovative approaches, orthodontic professionals can adopt evidence-based practices that improve patient outcomes and reduce the burden of mucosal ulcers during orthodontic treatment.

CONCLUSIONS

Mucosal ulcers are a common and painful complication in orthodontic patients, significantly impacting their quality of life and treatment compliance. Understanding the typical presentation and symptoms, recognizing the high incidence and prevalence, and acknowledging the substantial impact on patients underscore the importance of addressing this issue. The primary causes of mucosal ulcers include mechanical irritation from orthodontic appliances, inadequate oral hygiene, and other contributing factors such as diet, stress, and individual susceptibility. Effective management and prevention strategies, including the use of orthodontic wax, adjusting appliances, maintaining good oral hygiene, and utilizing various treatment options, are essential in mitigating the effects of mucosal ulcers. Additionally, recent research and innovative approaches, such as low-level laser therapy, biocompatible materials, custom appliances, saliva substitutes, and probiotics, offer promising solutions for reducing the incidence and severity of these lesions.

To better manage and prevent mucosal ulcers during orthodontic treatment, we encourage further research into the underlying mechanisms and effective interventions for these lesions. Continued exploration of innovative approaches and new technologies will be crucial in advancing patient care. Improved clinical practices, including regular adjustments of orthodontic appliances and personalized treatment plans, can help minimize the risk of ulcer formation. Enhanced patient education is also vital; empowering patients with knowledge about preventive measures, recognizing early signs of ulcers, and seeking timely intervention can significantly improve their experience and treatment outcomes. By fostering a collaborative effort among researchers, clinicians, and patients, we can achieve better management and prevention of mucosal ulcers, ultimately enhancing the overall success of orthodontic treatment.

FOOTNOTES

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