

HIV-Related Oral Lesions: A Comprehensive Overview

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Abstract

Human Immunodeficiency Virus (HIV) significantly compromises the immune system, predisposing affected individuals to a wide range of opportunistic infections and neoplastic conditions. Among these, oral lesions are often the first clinical manifestations of HIV infection and serve as important indicators of immune status, disease progression, and treatment efficacy. This comprehensive overview synthesizes current knowledge on HIV-related oral lesions, emphasizing their epidemiology, pathogenesis, clinical features, diagnosis, and management strategies. Oral manifestations are among the earliest and most frequent indicators of HIV infection, affecting 30% to 80% of HIV-positive individuals depending on disease stage and access to antiretroviral therapy (ART). These lesions are classified into strongly associated, less commonly associated, and occasionally associated conditions with HIV, as per the classification by the EC-Clearinghouse and WHO Collaborating Centre. Strongly associated lesions include oral candidiasis, oral hairy leukoplakia, Kaposi's sarcoma, and necrotizing ulcerative periodontitis. These conditions not only affect oral health and quality of life but also play a prognostic role, often correlating with declining CD4+ T-cell counts and increasing viral load.

With the advent and widespread adoption of highly active antiretroviral therapy (HAART), the incidence and severity of many HIV-associated oral conditions have declined. However, certain lesions persist or manifest differently due to immunological reconstitution or other co-factors such as smoking, co-infections, and ART-induced salivary gland dysfunction. This review highlights the importance of early detection and the role of dental practitioners in the multidisciplinary management of HIV-infected individuals. It also explores diagnostic tools such as cytology, biopsy, and polymerase chain reaction (PCR) techniques for lesion identification, as well as evolving therapeutic approaches including antifungals, antivirals, and immune-modulating agents.

Keywords: HIV-related oral lesions; Oral manifestations of HIV; Opportunistic infections; Oral candidiasis; Oral hairy leukoplakia; Kaposi's sarcoma; Necrotizing ulcerative periodontitis; Antiretroviral therapy (ART); HIV diagnosis; Immunocompromised patients; Oral health and HIV

Introduction

HIV-related oral lesions are significant indicators of immune suppression and serve as early diagnostic markers for HIV/AIDS. These lesions often precede systemic symptoms and are associated with disease progression [1]. This article provides an in-depth review of the epidemiology, pathogenesis, clinical manifestations, diagnosis, and management of oral lesions in HIV-infected individuals. Human Immunodeficiency Virus (HIV) weakens the immune system, predisposing individuals to opportunistic infections and malignancies. Oral manifestations are common and often serve as early indicators of disease progression [2]. The prevalence of oral lesions ranges from 30% to 80% in HIV-infected individuals, making oral examination vital for diagnosis and monitoring. Human Immunodeficiency Virus (HIV) remains a global public health challenge, affecting over 38 million people worldwide. Although considerable advancements have been made in its diagnosis, treatment, and management, the disease continues to exert profound effects on the immune system [3]. Among the earliest and most telling signs of HIV infection are lesions that manifest in the oral cavity. These lesions not only reflect underlying immune deterioration but also act as clinical harbingers of disease progression, treatment response, and potential co-infections [4]. Oral lesions associated with HIV can be broadly categorized based on their frequency and specificity to HIV infection. They encompass a spectrum of infections, neoplasms, and immune-mediated conditions [5]. Commonly encountered lesions include oral candidiasis, which remains the most prevalent, as well as oral hairy leukoplakia, Kaposi's sarcoma, and various forms of periodontal disease. The presence and

severity of these lesions often correlate with immunosuppression levels, typically marked by CD4+ T-cell counts below 200 cells/mm³ [6].

The role of oral health professionals is critical in the early recognition and management of these lesions. With the widespread use of antiretroviral therapy (ART), especially highly active antiretroviral therapy (HAART), the clinical landscape of HIV-related oral conditions has shifted [7]. While the prevalence of some lesions has declined, others have emerged or changed in presentation due to immune reconstitution or long-term ART effects [8].

This comprehensive overview aims to provide clinicians, researchers, and oral health practitioners with an in-depth understanding of HIV-related oral lesions. It addresses the pathogenesis, clinical manifestations, diagnostic protocols, and current therapeutic strategies, emphasizing the importance of interdisciplinary care in improving the quality of life and clinical outcomes for individuals living with HIV.

Epidemiology and risk factors

Oral lesions occur at all stages of HIV but are more frequent as the CD4+ T-cell count declines below 200 cells/mm³. Risk factors for oral

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lesions include:

- Low CD4 count and high viral load
- Poor oral hygiene
- Smoking and alcohol use
- Nutritional deficiencies
- Co-infection with other pathogens (e.g., Candida, Epstein-Barr virus)

HIV-associated oral lesions are classified into:

- Fungal infections
- Viral infections
- Bacterial infections
- Neoplastic lesions
- Ulcerative conditions
- Miscellaneous conditions

Oral Candidiasis, The most common HIV-related oral lesion, present in 60-90% of patients. It manifests as:

Pseudomembranous candidiasis, White, curd-like plaques that can be scraped off.

Erythematous candidiasis, Red, atrophic patches on the tongue and palate.

Angular cheilitis, cracking and erythema at the labial commissures.

Pathogenesis, Caused by Candida albicans, it thrives due to immune suppression.

Viral Infections

Oral Hairy Leukoplakia (OHL), Caused by Epstein-Barr virus (EBV), it appears as white, corrugated plaques on the lateral tongue, resistant to scraping.

Herpes Simplex Virus (HSV), Presents as painful vesicles and ulcers, often chronic and recurrent.

Human Papillomavirus (HPV), Causes papillomas or warts, which may be exophytic or flat.

Necrotizing Ulcerative Gingivitis (NUG) and Necrotizing Ulcerative Periodontitis (NUP), Characterized by severe pain, spontaneous bleeding, and rapid tissue destruction.

Mycobacterium avium complex (MAC) and Mycobacterium tuberculosis may also present as oral ulcerations.

Kaposi's Sarcoma (KS), The most common HIV-associated malignancy, caused by Human Herpesvirus-8 (HHV-8). It appears as red, purple, or brown macules, plaques, or nodules, often on the palate or gingiva.

Non-Hodgkin's Lymphoma (NHL), Presents as rapidly growing, painful masses with ulceration.

Aphthous ulcers, Common in HIV, presenting as painful, shallow, round or oval ulcers with a yellowish base and erythematous halo.

Histoplasmosis and Cryptococcosis, May cause chronic ulcers in immunocompromised individuals.

Xerostomia, Reduced salivary flow due to HIV-associated salivary gland disease or antiretroviral therapy (ART).

Hyperpigmentation, Can result from HIV infection or medications such as zidovudine.

Diagnosis

Diagnosing oral lesions in HIV involves,

- Clinical examination, Thorough oral inspection, noting size, color, and distribution of lesions.
- Microbiological testing, Oral swabs or biopsies for culture and staining.
- Serology and PCR, Detect viral infections (HSV, EBV, HPV).
- Biopsy and histopathology, To confirm malignancies like KS or NHL.
- CD4 count and viral load monitoring, To correlate oral findings with systemic immune status.

Management depends on the underlying cause and severity of the lesion,

First-line, Topical antifungals (nystatin, clotrimazole).

Systemic therapy, Fluconazole or itraconazole for refractory cases.

HSV, Acyclovir, valacyclovir, or famciclovir.

OHL, No treatment usually required, but acyclovir or ganciclovir may help.

HPV, Surgical excision or cryotherapy for large lesions.

NUG/NUP, Debridement, chlorhexidine rinses, and systemic antibiotics (metronidazole or amoxicillin).

KS, Chemotherapy (doxorubicin, paclitaxel) and antiretroviral therapy (ART) are effective.

NHL, Chemotherapy combined with ART.

Pain management, Analgesics and topical anesthetics.

Oral hygiene, Regular dental visits and professional cleaning.

Nutritional support, Supplements for malnourished individuals.

Prevention and oral health care

Regular dental visits, Early detection and management of oral lesions.

Oral hygiene maintenance, Brushing twice daily, flossing, and using antiseptic mouthwashes.

Smoking cessation, Reduces the risk of oral candidiasis and periodontal diseases.

Early ART initiation, Prevents the progression of HIV and reduces oral lesion occurrence.

Conclusion

Oral lesions are common in HIV-infected individuals and often serve as indicators of disease progression. Early recognition, diagnosis, and appropriate management are essential for improving the quality of life of affected individuals. Dentists and oral healthcare providers play a crucial role in identifying and managing these lesions as part of

comprehensive HIV care. oral lesions continue to serve as vital clinical indicators in HIV care. Enhancing awareness and clinical competencies among oral health professionals is essential for early intervention, comprehensive management, and improved patient outcomes in the era of chronic HIV disease management.

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