



The Role of Antiretroviral Therapy When Treating the Periodontal Health in of an HIV-Positive 46-year-old male

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Abstract

Patients with human immunodeficiency virus (HIV) are at special risk for oral health problems and when left untreated disease progression can be dramatic. Some of the most common oral manifestations for people with HIV are the following chronic oral diseases: gingivitis, periodontitis, canker sores, oral warts, fever blisters, oral candidiasis, hairy leukoplakia, dental caries and in later stages, neoplasms. Oral presentations can have either asymptomatic or acute responses to HIV infection. Studies show that individuals on antiretroviral therapy (ART) tend to have less severe periodontal disease compared to those not on treatment, with lower levels of gum inflammation and bone loss. By controlling HIV replication, ART helps restore some immune function, allowing the body to better fight off the bacteria responsible for periodontal disease. This article explores the oral presentation of untreated HIV in a 46-year-old male, and how non-compliance with antiretroviral medications affect the prognosis and the treatment of advanced chronic periodontitis.

Keywords: Immunodeficiency Virus; Candidiasis; Chronic Periodontitis; ARTS

Introduction

Human immunodeficiency virus (HIV) remains a global health challenge, with an estimated 38 million people worldwide living with the virus in 2019. Although access to antiretroviral therapy (ART) has increased, 1.7 million new infections and 690,000 HIV-related deaths still occurred that year [1]. HIV infection continues to impact millions, and in 2015 alone, the virus and its related complications claimed the lives of around 1.1 million people. HIV is classified in the Retroviridae family and belongs to the genus

Lentivirus [3]. First identified in 1983 [4]. Transmission of HIV-1 occurs when the virus is introduced to mucosal surfaces, such as during sexual contact, or through direct inoculation into the bloodstream, as can occur with needle sharing or exposure to contaminated blood [5].

The advent of ART in 1995 marked a turning point, transforming HIV from a fatal diagnosis to a manageable chronic condition for those with access and who could afford treatment [2].

The field of antiretroviral pharmacology has advanced greatly since the FDA approved the first antiretroviral drug, zidovudine (a nucleoside reverse transcriptase inhibitor, or NRTI), in 1987. Since then, multiple classes of antiretroviral medications have been developed, each targeting different stages in the HIV life cycle. Current combination antiretroviral therapy (ART) generally includes drugs from at least two different classes, which effectively suppress viral replication, restore immune function, and improve patient survival rates [6].

ART now includes a variety of drug classes: nucleoside reverse transcriptase inhibitors (NRTIs), non-nucleoside reverse transcriptase inhibitors (NNRTIs), integrase inhibitors (INSTIs), protease inhibitors, pharmacokinetic boosters, and entry inhibitors. NRTIs, such as abacavir™, lamivudine™, and zidovudine™, were the first antiretrovirals introduced and remain in use today. Newer drugs, like second-generation integrase inhibitors, have a higher resistance barrier, meaning multiple mutations are required for the virus to develop resistance [6].

One of the most impactful advancements in treatment is highly active antiretroviral therapy (HAART). This modern regimen has transformed HIV into a manageable chronic condition by significantly lowering viral load and boosting CD4+ T lymphocyte counts. This immune restoration reduces the likelihood of opportunistic infections and illnesses related to immunosuppression, greatly improving the quality of life and survival for individuals with HIV [7].

Oral signs are often the earliest indicators of HIV infection and can provide insights into the progression of HIV/AIDS. Oral lesions appear in up to 50% of individuals with HIV and as many as 80% of those with AIDS [8], making them one of the first clinical signs of HIV infection and reliable markers of immune suppression. These oral manifestations are valuable for early screening, diagnosis, and intervention for HIV/AIDS [9].

Periodontal disease, characterized by chronic inflammation of the gums, is widespread among adults and can lead to severe oral inflammatory conditions, especially in immunocompromised individuals [2]. Research shows that people living with HIV are more likely to experience significant oral health issues more frequently, including oral candidiasis, hairy leukoplakia, aphthous ulcers, and herpes simplex even while on ART [3].

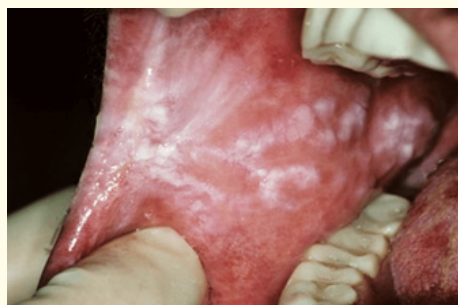


Figure 1: POral Candidiasis presentation in an HIV-positive patient.



Figure 2: Oral Hairy Leukoplakia in an HIV-positive patient.



Figure 3: Oral Aphthous Ulcer in an HIV-positive patient.



Figure 4: Oral Herpes Simplex in an HIV-positive patient.

Clinical Findings

A 46-year-old male patient presented to the clinic at Howard University College of Dentistry for an initial screening with the chief complaint of: "I need a dental cleaning". Prior to this visit, the patient stated he had not received a medical examination for the past six months. He was recently diagnosed with HIV three months ago and stated he had begun antiretroviral therapy, using both tenofovir disoproxil fumarate and efavirenz™, but had not been compliant with the recommended dosages of the medications. As part of his examination, a medical consultation was requested to ascertain his viral levels and eligibility to be treated at the clinic. In going over his dental history, the patient revealed he had seen a dentist within 24 months who had recommended that he extract his teeth and have removable partial dentures fabricated, but that he had preferred implants instead which necessitated this second opinion for his care. His vitals were 142/82 mmHg with a pulse of 77/bpm and resting respiration of 14bpm. The patient reported that he smoked three packs of cigarettes daily, and consumed alcohol socially.

A comprehensive oral examination included visual and tactile components, that began with inspection of the face, neck, lips and throat, followed by manual palpation of the mouth, including the roof, floor, sides, tongue, and tonsillar pillars. Extra orally, the patient presented with non-significant findings, and with no asymmetries, and without clicking or popping of the temporomandibular joints bilaterally. His submandibular lymph nodes presented as fluctuant, soft, and depressible to touch. The patient reported that the bilateral submandibular area felt tender to him but could not report how long he had been feeling this tenderness now that he was at his dental appointment.

Intraorally, the patient presented with severely erythematous gingival tissues, which bled when palpated, and calculus that appeared on the lingual portions of his maxillary and mandibular teeth, visible attachment loss where larger than 4mm periodontal pockets could be probed and loose teeth with grades greater than II. His gingival tissues did not present with healthy stippling. He had missing teeth #7, #8, #9, #10, #13, #20, #18, #17, and #31; an occlusal disto-occlusal carious lesion presented on tooth #4 and teeth #28, #29 and #30 presented with occlusal caries. The patient reported that he brushed once a day and did not floss or use an oral rinse. The patient was counseled on the importance of receiving prompt care for his HIV infection, his elevated ASA II hypertensive state and on smoking cessation. An oral cancer screening yielded non-significant findings, with no presentation of nodules or hardened lumps palpated around the submandibular, submen-

tal, and pre and post auricular areas. The patient did present with white patches, 4-7mm in diameter diffusely spread on the left and right buccal mucosa adjacent to the posterior teeth. A culture biopsy was put in his treatment plan to rule out neoplasms or other malignancies, but a differential diagnosis of oral candidiasis was noted for the white plaque on the buccal mucosa due to the chronic HIV infection present and his intermittent use of his ARTs.

Due to the patient's HIV positivity, the medical consultation form was relayed to the patient for his virologist, requesting results of laboratory tests that assessed his HIV RNA level, CD4⁺ cell count along with general health lipid levels, kidney and liver function, complete blood cell count and glucose levels. Additionally, an ART resistance level results were requested (reverse transcriptase-protease genotype) as this would let dental providers know if he was responding appropriately to his antiretroviral medications; also needed were results of his potential co-infections such as viral hepatitis A, B and C, latent tuberculosis and any evidence of other sexual transmitted diseases. For this case, it would be imperative to work closely with his virologist and have evidence of updated laboratory results of his healthy viral levels and blood cell levels every three months until completion of his dental case. Additionally, counselling with a psychologist was recommended as the patient addressed his HIV care and adjusted to his new diagnosis.

Radiographic Findings

A full mouth series of radiographs were completed along with a panorex radiograph. Teeth #7, #8, #9, #10, #13, #20, #18, #17, #31 presented as missing radiographically. Additionally, severe vertical bone loss was noted in the areas of teeth #3 (mesial), #4 (mesial and distal), #5 (mesial and distal), #6 (distal). Severe vertical and interdental bone loss was also noted on teeth #28, #29, #30; the interseptal areas of teeth #24, #25 presented with severe bone loss and #23 and #26 presented with bone loss in the mesial areas. The largest vertical boney defects seen were on #4 which when probed had an 8mm defect in the mesial and distal; #5 when probed presented with a defect that was 9mm; #14 when probed had a defect that was 7mm in the mesial and 6mm in the distal; #15 presented when probed had a defect that was 8mm in the mesial and 9mm in the distal; #16 presented when probed had a defect that was 6mm in the mesial and 9mm in the distal.

Treatment plan

Due to the extent of osseous destruction and gingival attachment loss both clinically and radiographically, regular compliance for this patient in terms of his antiretroviral regimen could not be confirmed. His laboratory test results were an imperative compo-

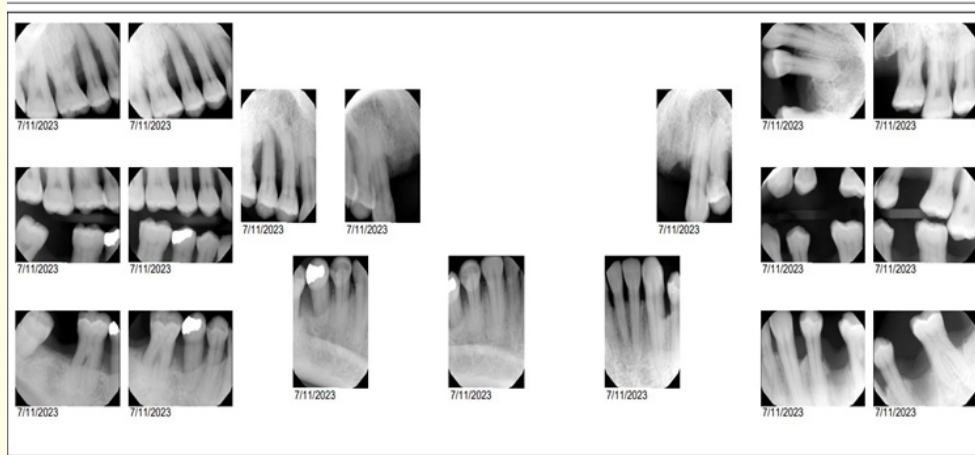


Figure 5

ment of this treatment plan, as it would provide information that his HIV viral load was under control, and that his CD4+ counts were at good, functioning levels. A concern for his alveolar bone if the HIV was not under control was the ability of the patient's alveolar bone to support any prostheses that were being considered as part of his case. Healthy, bone with strong loading capabilities were needed to support any type of removable or fixed prosthesis that would sit on top of or be integrated into his alveolar bone in the weight-bearing areas of his mouth such as the maxillary and mandibular dental ridges, the maxillary tuberosities, palate, and mandibular retromolar areas in this case. Prosthodontic considerations included reestablishing his vertical dimension of occlusion and vertical dimension at rest (VDO/VDR) once edentulous in the maxilla and mandible. A cone beam computed tomography (CBCT) scan was added to the treatment plan to evaluate bony structures, sinuses, and bone levels in three-dimension to ideally ascertain the direction and positioning of implants as part of his treatment planning. His ability to heal would be impacted by his immunocompromised status and this also was a consideration as treatment planning was implemented.

The patient was offered three treatment plans that focused on having a complete periodontal evaluation, and options that included

- **Option 1:** Extraction of all of his remaining dentition, tissue conditioning, with/without osseous augmentation, and a full complete maxillary denture and mandibular denture.
- **Option 2:** Extraction of his remaining dentition, bone augmentation and endosteal implants to replace and reestablish his occlusion. The patient declined both this treatment plan and treatment Option 1 and stated that his main concern was not extracting his teeth but keeping them as long as he could.

- **Option 3:** In response to the request to keep the remaining dentition by the patient, root planning and scaling of mandibular teeth, extractions of maxillary teeth with mandibular splinting using a thin 0.016-inch fiber reinforced stainless steel flexible wire was offered as treatment. The limited prognosis of this plan and the hopelessness of the maxillary dentition along with the benefits of disease control from the maxillary extractions given the current immunocompromised state of the patient's health were explained to the patient with this option.

The results at the complete periodontal examination are presented below

Discussion

Literature indicates that there has been a significant decrease in the prevalence of the oral manifestations of HIV in response to the use of antiretroviral therapy [11]. HIV patients who are not compliant in taking their highly active antiretroviral therapy (ART) routinely have an increased risk of developing chronic periodontitis. For example, HIV patients who are less acquiescent with their antiretroviral regimens have higher bleeding scores, a clinical marker for inflammation, a higher risk of orofacial pain, larger periodontal pockets and greater attachment loss. Due to the dramatic periodontal presentation of the patient in this case, it was ascertained that this patient's HIV infection was addressed with an antiretroviral regimen much later than his HIV diagnosis. Additionally, it could not be determined how much of the regimen of tenofovir disoproxil fumarate and efavirenz™ the patient had taken or when. Patients who are immunocompromised are at risk of severe chronic periodontitis and presentations of gross bone loss upon probing and radiographic examination.

Dental providers can offer the best solutions when it comes to a patient's dental care, but when patients decline care based on personal preference, it is imperative to inform, document and provide alternatives to care that can still best serve the patient. Dental providers must ensure that proper documentation of laboratory tests, acceptance of treatment plans and consent forms have all been properly discussed and made part of the patient's health record. When dentists routinely follow-up with other healthcare providers, this allows for adjustments to care when needed. Treatment plans with several options can be regularly revisited to improve the dental prognoses for HIV-positive patients when there has been non-compliance to prescribed antiretroviral medications. The goal for treating HIV-positive patients is to ensure that they are compliant with their ARTs, which in turn, enhance successful outcomes to dental treatment and improve their overall health status.

Declaration of Patient Consent

The authors of this article certify that patient consent forms were not necessary with this publication because appropriate measures were taken to conceal any identifiable information of the patient utilized in this article.

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Conflicts of Interest

Nil.

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