

The background of the page features a dark teal color. At the top and bottom, there are white outlines of human teeth. Scattered across the teal background are several light-colored icons: a circular virus-like particle with a stylized 'S' inside, and three dental instruments (an explorer, a mirror, and a scaler) on the left side. A solid orange square is located on the left edge, partially overlapping the teal background.

ORAL HEALTH CARE

for the HIV-Infected Patient

HIV PROVIDER REFERENCE SERIES

A PUBLICATION OF THE MOUNTAIN PLAINS AIDS EDUCATION AND TRAINING CENTER

ORAL HEALTH CARE FOR THE HIV-INFECTED PATIENT • 2013

AUTHORS

Sally Preston, DMD

Assistant Professor
University of Colorado School of Dental Medicine
Aurora CO

David A. Reznik, DDS

Director, Oral Health Center, Infectious Disease
Program, Chief Dental Service Grady Health System
Atlanta GA

EDITOR

Lucy Bradley-Springer, PhD, RN, ACRN, FAAN

Associate Professor, Infectious Diseases Division
PI, Mountain Plains AIDS
Education and Training Center
Aurora CO

REVIEWER

Alfonso Salazar-Celi, DDS

Dental Director, Howard Dental Center
Denver CO

*MPAETC is grateful to the Howard Dental Center
for their assistance in the development of this guide.*

TABLE OF CONTENTS

Introduction.....	3	Common Oral Health Problems and HIV	12
HIV Basics	4	Xerostomia	12
HIV and the Approach to Oral Health Care	4	Periodontal Disease.....	13
Health History.....	5	Treatment Protocol.....	18
Antibiotic Use and Premedication Guidelines.....	8	Common Oral Infections and HIV	19
Ultrasonic Use	8	Fungal Infections.....	19
Allergies and Drug Interactions.....	8	Viral Infections	19
Medical Considerations in Dental Care of the		Aphthous Stomatitis.....	21
HIV-Infected Patient	9	Oropharyngeal Cancers and HIV.....	21
Hepatitis and Hepatic Insufficiency	9	Squamous Cell Carcinoma	22
Bleeding and Hematological Disorders	9	Kaposi's Sarcoma	22
Metabolic Disorders.....	9	Post-Exposure Prophylaxis (PEP).....	22
Motor Function/Neuropathies.....	11	Conclusion.....	23
Mental/Psychiatric Status.....	11	Resources.....	24
Tuberculosis (TB).....	11	Bibliography	25

INTRODUCTION

The Centers for Disease Control and Prevention (CDC) published reports of the first U.S. cases of what would become known as the acquired immunodeficiency syndrome (AIDS) in 1981. Early cases were found mostly in young men with a history of sexual intercourse with men (MSM) and injection drug users (IDU). Within 15 months of the initial reports, more than 800 AIDS-related deaths had been documented in the United States; the death rate climbed steadily until the mid-1990s when effective treatments were developed.

The human immunodeficiency virus (HIV) was determined to be the cause of AIDS in 1983 and the first ELISA test for HIV antibody was licensed in 1985. It was not until 1987 that the first drug to treat HIV was approved by the Food and Drug Administration. Since 1985, a number of advances have been made in understanding how HIV causes disease and how to treat it. Decreasing death rates and longer survival times are signs of significant progress. Treatment now consists of combination drug therapies that can often be prescribed in once- or twice-daily regimens.

For those who have access to comprehensive care and who are adherent to prescribed drug regimens, HIV infection has become a chronic disease with life expectancies of more than 60 years of age. Unfortunately, many people living with HIV infection (PLWH) do not access (or have access to) the care that could improve their health, prolong their lives, and decrease the risk that they will transmit HIV to others. About 20% of HIV-infected people in the United States are unaware that they are infected and about 30% of people who know they are infected are not currently in care.

In the United States, an estimated 50,000 new cases of HIV infection occur each year. The majority of PLWH are MSM, but women, heterosexuals, children, and IDUs have been impacted. Although HIV affects people in all social, racial, and economic strata, people who live in poverty are disproportionately affected. A study by Denning and DiNenno (2010) found that the HIV prevalence rate in 23 impoverished U.S. urban areas was 2.1%, which is comparable to HIV prevalence rates in Ethiopia and Haiti and is 20 times higher than the rate in the general population of U.S. heterosexuals (0.1%). PLWH who also have to deal with poverty, stigma, and discrimination have significant problems accessing health care in general and dental health care in particular.

HIV BASICS

HIV is a retrovirus that causes immune deficiency in humans. It can be transmitted from an infected person to an uninfected partner during sexual intercourse or when sharing equipment used to inject drugs. Infection can occur during exposure to the blood of an HIV-infected person, in transfusions and accidental exposures to blood, for example. HIV can also be transmitted to infants during pregnancy, labor and delivery, or breastfeeding. Prevention methods have now assured the safety of the U.S. blood supply and have drastically decreased the rate of perinatal infection (to < 2%). Risk behaviors associated with sexual intercourse and injection drug use have been harder to address.

HIV is an obligate parasite: It cannot survive and replicate outside of a living cell. Retroviruses, which have RNA rather than DNA for a genetic structure, require the presence of a specific set of enzymes, including **reverse transcriptase**, **integrase**, and **protease**, to replicate in infected cells. This is important because inhibiting these enzymes has been the key approach to antiretroviral therapy (ART).

HIV enters human cells by binding to and fusing with CD4 receptor sites on the human cell membrane. Cells with CD4 receptor sites include CD4+ T lymphocytes (also known as T-helper cells or CD4+ T cells), central and peripheral neurons, and monocytes. The cell predominantly affected by this process is the CD4+ T lymphocyte, which is unfortunate, because CD4+ T cells play a pivotal role in human immune function by

(a) recognizing infectious organisms and neoplasias, and (b) secreting cytokines that initiate an immune response in reaction to these threats. Immune dysfunction results predominantly from the destruction of CD4+ T cells during the HIV replication process.

Impaired immune response leads to the development of opportunistic infections (OIs), which are infections that would not have occurred if the immune system had been working well. OIs can be caused by uncommon organisms, as well as by unusual infections (i.e., disseminated or fulminant infections) caused by common pathogens.

HIV AND THE APPROACH TO ORAL HEALTH CARE

Symptoms of HIV and HIV-associated infections are often seen in the mouth. Common oral conditions that normally cause minor or limited problems may be exaggerated and difficult to treat in PLWH. They may also indicate significant changes in the status of the patient's HIV infection and overall health. Therefore, it is critical for dental providers to be familiar with common oral pathologies and to know how they manifest in PLWH.

It is important for oral health professionals to understand HIV infection and current treatment recommendations in order to provide appropriate treatment. The nature of HIV infection changed with the advent of more effective ART in the mid-1990s. A diagnosis of HIV is no longer considered to be a death sentence; many PLWH live close-to-normal life spans.

Remember, however, that:

- There is no cure for HIV.
- Viral-induced immune dysfunction can cause many complications, including dental and oral health problems.
- The virus replicates relentlessly and has an uncanny ability to mutate and resist medications used in ART, especially when those medications are not used consistently and correctly.

To live well, PLWH must commit to a lifetime of taking medications and seeing care providers on a frequent basis. Oral conditions can change rapidly in PLWH due to changes in lab values, medication changes, stress, and co-infections with other organisms such as the human papilloma virus (HPV). As with most chronic diseases, patients will need to take medications consistently, deal with the side effects that accompany those medications, and cope with other aspects of chronic disease.

Oral health plays an essential role in helping PLWH achieve and sustain a high quality of life. Oral health providers deliver key clinical care for PLWH, allowing the patient to:

- preserve/restore healthy teeth and periodontal (gum) tissue
- maintain nutrition and hydration
- avoid infections in the mouth
- prevent/treat oral pain
- avert cosmetic changes

Health History

As with any patient, a thorough and complete health history is a crucial first step. The professional relationship with an HIV-infected patient, as with any other patient, is based on an initial history that is updated at each subsequent visit. The following activities will help you evaluate the patient's overall HIV status and provide information that will facilitate appropriate and safe dental care.

Document contact information for the patient's HIV care provider in the dental record. It is important for PLWH to be under the care of providers well versed in HIV care. Clinicians who treat HIV are aware of the need for good oral health in their patients and can provide valuable collaborations and consultations.

Record the most recent CD4+ T cell count and viral load at every dental visit. These values help track progression of the infection and medication efficacy. Well-monitored patients will have these values checked every 4-6 months and should be able to report their values to you.

- *The CD4+ T cell count is a marker for immune function.* The CD4+ T lymphocyte count reflects the number of cells/mm³ circulating in the blood. The lower the number, the more the immune system is suppressed. A CD4+ T lymphocyte count ≤ 200 cells/mm³ is diagnostic for AIDS and indicative of existing immune dysfunction.

Table 1. Critical Laboratory Values: CD4+ T Cell Counts and HIV Viral Loads

Lab results will indicate two readings for the CD4+ T cell count: the number of CD4+T cells/mm³ and the CD4+T cell percentage of all white blood cells. These give the practitioner a good idea of the immune health of the patient.

CD4+ T cell counts	CD4%	Clinical Implications
> 600 cells/mm ³	32%-50%	Normal value, healthy immune function
< 500 cells/mm ³	< 29%	Initial immune suppression
201–499 cells/mm ³	14%-28%	Manifestations of some OIs, including oral lesions seen in association with HIV
≤ 200 cells/mm ³	< 14%	Significant immune suppression, AIDS diagnosis, appearance of major OIs
American Academy of Oral Medicine (2001)		
Viral Load	Clinical Implications	
undetectable	Viral replication well controlled, control may be attributed to the patient's immune response (especially early in the disease) or to ART. The goal of ART is to achieve a non-detectable viral load.	
detectable	Presence of enough viral copies in the blood to be counted, which may indicate lack of viral control.	

- *The viral load is a quantitative measure of HIV RNA in the plasma.* Viral replication in HIV infection is rapid and continuous. From the time of infection, millions of new viral copies are produced daily. The higher the viral load, the more active the infection and the greater the risk for disease progression.

Review the patient's medications at every visit. Dental care decisions should be made with full knowledge of the HIV-infected patient's medications, their side effects, and potential drug interactions.

- Most PLWH take a combination of medications to combat HIV, treat or prevent the complications of HIV, and/or treat the side effects of the medications themselves. Many of the problems experienced by PLWH are related to the side effects of the medications they take.
- At each visit, ask if any medications have changed.
- Many of the medications commonly used to care for PLWH can interact with other prescription medicines,

over-the-counter drugs, alternative medicines, and street drugs. For example, fluconazole should be avoided in patients on darunavir (Prezista®). Protease inhibitors may increase the potential for side effects of codeine-containing compounds, but the clinical efficacy does not seem to be impacted. The use of acetaminophen should be used judiciously especially in patients with liver disease because of toxicity. The maximum recommended dose is 4,000 mgs/24 hour period for healthy patients without liver disease.

- HIV-expert clinicians are a good source of information; they can help coordinate oral health procedures and prescriptions with the patient's overall treatment plan. Fortunately for dental providers, commonly prescribed antibiotics and pain medications have minimal, if any, adverse reactions with ART.

Other key concerns. The health history for PLWH should include areas that may indicate problems with general health as well as immune function.

- *Recent hospitalizations.* Patients in consistent HIV care and with good viral suppression do not generally need to be hospitalized for HIV-related problems. Hospitalization may be an indication of HIV disease progression and poor viral control, or it may be required for a problem unrelated to HIV infection.

- *History of OIs.* This information is valuable in assessing a patient's susceptibility to certain infections as well as the overall status of the disease. The range of OIs that affect PLWH is broad and includes infections caused by fungi, parasites, viruses, bacteria, and protozoa.
- *Co-infections.* Approximately one third of PLWH also have viral hepatitis. Co-infected patients do not fare as well medically as those who are singly infected. HIV increases the risk for end stage liver disease and cirrhosis in people co-infected with hepatitis B virus (HBV) and/or hepatitis C virus (HCV). In addition, PLWH are more likely to have tuberculosis (TB). Dental care providers need to be aware of these infections in order to provide the most appropriate care for their patients. As with all patients, adherence to standard precaution guidelines is essential.
- *Tobacco, alcohol, and illicit drug use.* PLWH have higher rates of substance use (especially tobacco) than uninfected people, which is a major consideration for dental care. The progression of HIV disease is adversely affected by smoking, alcohol, and illicit drug use, all of which can cause significant problems for oral health. Recreational drug use, especially cocaine, methamphetamine, and ecstasy, in combination with dental anesthetics containing vasoconstrictors can be dangerous. In these cases, avoid using anesthetics with vasoconstrictors.

Antibiotic Use and Premedication Guidelines

There is no reason to routinely medicate HIV-infected patients based on CD4+ T cell counts or AIDS diagnoses for routine dental care including oral surgery. Premedication guidelines set by the American Heart Association for the prevention of bacterial endocarditis should be followed when treating PLWH as with all patients (ADA.org).

Having said that, some important concerns need to be kept in mind:

- Severely immune-compromised patients may suffer from neutropenia (neutrophil count $< 500/\text{mm}^3$) and, if so, should be pre-medicated with antibiotics. Consultation with the patient's HIV primary care provider is recommended.
- Due to the higher incidence of diabetes, hemophilia, and avascular necrosis in PLWH, the need for joint replacement occurs more often. In December of 2012 the American Academy of Orthopaedic Surgeons (AAOS) and the American Dental Association (ADA) proposed new collaborative evidence-based premedication guidelines for patients with joint replacements. They found that there is insufficient evidence to recommend the routine use of antibiotics for patients with orthopaedic implants prior to having dental procedures. Noted, however, in the guideline is that immunocompromised patients, including those with HIV infection, might be at greater risk for implant infections and that antibiotic use should be considered in this group.

Ultrasonic Use

The ultrasonic scaler is **safe**. In many offices the use of either a high-speed ultrasonic scaler (e.g., piezoelectric or Cavitron[®]) is used in conjunction with hand scaling. When the proper standard precautions are implemented, it is **very safe** for both the patient and provider. **There is no clear evidence that powered dental and surgical instruments can generate aerosols containing infective blood borne pathogens.**

Aerosols should not be confused with skin or mucous membrane exposures from droplets and splashes of blood or body fluid. To date, transmission of blood borne pathogens through aerosols has not been documented.

Allergies and Drug Interactions

Most HIV-infected patients are exposed to many medications over the course of the illness. Judicious use of antibiotics as well as pain medications is recommended. Several excellent on-line sources can help determine the potential for adverse interactions between specific medications (see Resources Section). The Mountain-Plains AIDS Education and Training Center (MPAETC) Source Book (available at www.mpaetc.org) includes tables of the side effects and potential drug interactions of ART medications.

MEDICAL CONSIDERATIONS IN ORAL HEALTH CARE OF THE HIV-INFECTED PATIENT

For the vast majority of PLWH, there are no contraindications for routine dental care. However, for a few, especially those with severe immune dysfunction, medical concerns may require special considerations in the delivery of dental care.

Hepatitis and Hepatic Insufficiency

Liver disease due to viral hepatitis has become a leading cause of non-HIV-related morbidity and mortality for PLWH. Co-infection rates may be as high as 35%. HIV/HCV co-infected patients tend to experience more rapid disease progression and do not respond as well to present therapies as individuals with HCV mono-infection. Drug metabolism as well as coagulation issues are affected by hepatic infection and function.

Bleeding and Hematological Disorders

PLWH are at an increased risk for bleeding problems. Because of a higher incidence of intravascular thrombosis and cardiac arrhythmias, many take traditional anticoagulants such as warfarin and ASA. Increasingly, the newer anti-thrombin agents such as dabigatran (Pradaxa®) and rivaroxaban (Xarelto®) and newer antiplatelet medications such as clopidogrel (Plavix®) are being prescribed to prevent deep vein thrombosis and pulmonary embolism and following joint replacement surgery. The new anti-thrombin agents are shorter acting than warfarin and do not require monitoring of INR. Guidelines for dental treatment have not been firmly established for these newer agents, but general consensus is that they should not be discontinued for routine dental care.

PLWH also have bleeding problems related to impaired hepatic function secondary to co-infection with hepatitis, ART, or from the effects of the virus itself. HIV-related thrombocytopenia is rare but, in those cases, knowledge of a patient's platelet count is important. If a patient has a history of bleeding abnormalities, consultation with the patient's HIV care provider is imperative. The laboratory tests in Table 2 can help guide treatment.

Metabolic Disorders

Diabetes. PLWH are three times more likely to develop diabetes than those who are not infected. As with all diabetics, careful periodontal monitoring and special care in wound healing is crucial. Dental providers should be well versed in the use of glucometers and glucose readings should routinely be taken, especially before invasive procedures. If the dental office elects to use a glucometer to test blood glucose, the dental office is classified by the government as a medical laboratory, and must obtain a CLIA certificate. The law is called the Clinical Laboratory Improvement Amendment (CLIA). Information can be obtained from the Centers for Medicare and Medicaid Services website (www.cms.hhs.gov/center/clinical.asp).

Lipodystrophy. Approximately one third of all PLWH have lipid abnormalities. Lipodystrophy may be caused by ART medications, especially the nucleoside reverse transcriptase inhibitors and protease inhibitors. It is characterized by abnormal fat distribution

Table 2. Laboratory Tests and Interventions for Bleeding Abnormalities

Internationalized Normalized Ratio (INR) was established by the World Health Organization and is widely accepted as the norm for reporting prothrombin time for patients on warfarin. INR monitoring is not indicated for newer, shorter acting anticoagulants.

Anticoagulant therapy should generally not be discontinued for routine dental procedures including simple extractions. Normal INR is 0.8-1.2.

- Most dental procedures, including extractions, can be performed if the INR is < 3.
- If INR is > 3, consult the patient's HIV care provider; anticoagulant therapy may need to be adjusted.

Platelet Count

- Normal is 150,000/mm³ to 400,000/mm³.
- *HIV-Related Thrombocytopenia* is defined as a platelet count < 140,000/mm³. Dental work, including routine extractions, can be performed with platelet counts ≥ 60,000/mm³. If platelet count is < 60,000/mm³, platelet transfusion or steroids may be indicated.
- For all patients with a history of bleeding problems, the placement of intrasocket medicaments such as Surgicel® or Gelfoam® following oral surgery as well as suturing help to minimize post-operative bleeding.

and metabolism. Patients may experience fat deposits in the abdomen and upper back (buffalo hump), with wasting in the face and limbs. An increased incidence of hypercholesterolemia and hyperlipidemia are also characteristic of lipodystrophy and may require treatment with statins and other cardiac medications.

Other factors that contribute to cardiac disease in PLWH include smoking, hypertension, androgenic and anabolic steroid use, and increased levels of alpha interferon.

Adrenal insufficiency. HIV-related adrenal insufficiency can occur as a result of inflammatory responses to the disease and OIs. It occurs more often in PLWH with advanced disease and those who are not in care. Adrenal insufficiency is rare; when present, consultation with the patient's HIV-care provider is needed prior to dental treatment. Patients may not be able to produce sufficient endogenous mineralocorticoids and glucocorticoids to respond to the stress of dental procedures. Depending upon the level of stress anticipated for the procedure, a doubling of the patient's normal medications for adrenal insufficiency might be required on the day of the procedure.

Osteoporosis. PLWH are at increased risk of developing osteoporosis, and many patients are on bisphosphonate therapy. As with any patient on bisphosphonates, especially those on IV therapy or those on therapy for more than 3 years, caution should be taken when considering surgical procedures. Conservative alternatives such as root canal therapy should be considered over extraction. Although osteonecrosis is rare, it is important to inform the patient of the risks and to document the discussion with a signed informed consent for any surgical procedure. Because of the long half-life of bisphosphonates, discontinuation is not routinely recommended. In those cases requiring extensive surgery, consultation with the patient's HIV-care provider is advised.

Motor Function/Neuropathies

Peripheral neuropathy is common in PLWH. Neurologic disorders can be caused by HIV and/or by the medications used in ART. Patients may require help to get to the dental office and into or out of the dental chair. They may also be on high doses of pain medications and/or using alternate therapies to allay symptoms.

Mental/Psychiatric Status

HIV dementia can affect cognitive, motor, and behavioral activity. Memory loss and decreasing cognitive function are common, but may be subtle. It is important to know the mental capabilities of your patient to insure that s/he is able to understand treatment options, follow postoperative instructions, and get to and from dental appointments. It may be necessary to

request the assistance of an accompanying adult and to create written materials that will work for all patients in your practice, including those with reduced mental capabilities.

Many PLWH suffer from depression and/or other psychiatric illnesses. Some of these conditions may exist prior to HIV infection. Others may result from or be exacerbated by (a) the virus itself, (b) the medications needed to treat HIV and its associated conditions, or (c) the process of living and aging with HIV infection. For example, the prevalence of personality disorders for PLWH ranges from 15% to 20%. HIV-infected patients with personality disorders are at greater risk for mood disturbances, feelings of helplessness, tendencies to use substances, and social conflicts than are those without personality disorders. Being aware of the psychiatric challenges of the patient and working with the mental health team will help achieve cooperation and a successful clinical outcome.

Tuberculosis (TB)

PLWH are more likely to have contracted TB at some point in their lives. It is important to ascertain TB status and to refer patients with active disease to appropriate facilities for treatment. State Departments of Health closely monitor TB infection cases and active infection is rare. A patient with active TB needs to have been on appropriate medications and should have a negative smear, which normally occurs after 6 - 8 weeks on therapy, before being seen for routine care in a dental office. Special facilities designed to treat patients with active TB disease should be used when dental care cannot be delayed

COMMON ORAL HEALTH PROBLEMS AND HIV

Xerostomia

Xerostomia or dry mouth is one of the most significant oral complications associated with HIV infection. There is evidence to suggest that xerostomia seen in PLWH is a result not only of HIV but is also a side effect of antiretroviral medications. The toll on oral health can be devastating, leading to root caries, oral infection, periodontal disease, and loss of teeth.

Saliva is a critical component of a healthy oral environment. Xerostomia results when salivary glands do not function at optimal levels to produce the required amount of saliva for proper oral health. Lack of saliva is consistent with a lower pH in the oral cavity and an increased likelihood of fungal infections (oral candidiasis). Many medications are linked to dry mouth. Most notable are antihypertensive and antidepressant medications. Antihistamines, decongestants, and some pain medications can also trigger xerostomia. Illicit drug use, most notably methamphetamine and cocaine, can also cause xerostomia.

For many PLWH, xerostomia is a chronic, and sometimes debilitating, condition. It is challenging to treat, as it is usually a side effect of something necessary (ART) or something pathologic (HIV or salivary gland disease). Dental providers can offer a number of options to patients suffering from dry mouth. With experience and appropriate diagnosis and treatment protocols, some of the morbidity associated with xerostomia in PLWH can be alleviated.

Patients should be instructed about ways to help alleviate symptoms and minimize the damage caused by xerostomia, including:

- Drink plenty of water
- Avoid caffeine
- Chew sugarless gum and use sugarless candies/mints
- Avoid tobacco and alcohol (including mouth rinses that contain alcohol)
- Use a humidifier in the home
- Maintain a healthy diet low in sweets that can lead to caries
- Rinse with 0.12% chlorhexidine gluconate, which reduces caries-causing bacteria
- Line dentures with petroleum jelly or products designed to soothe tissues and increase adherence
- Use fluoride and antimicrobial toothpastes

Oral pilocarpine can be prescribed to help increase salivary gland saliva production. This should be done with caution, however, as the side effects can be significant. Pilocarpine stimulates the parasympathetic system and activates the muscarinic cholinergic receptors, which activate exocrine glands. Patients may experience sweating, diarrhea, chills, rhinitis, headaches, visual disturbances, respiratory distress, vomiting, and various cardiovascular complications such as pulmonary edema, bradycardia or tachycardia, and hypertension or hypotension.

Table 3. Treatment for Xerostomia

Systemic therapy	<p>Rx: pilocarpine HCl 5 mg</p> <p>Disp. 90 tablets</p> <p>Sig: take 1 tab TID before meals</p> <p>Note. Pilocarpine is metabolized by the liver and excreted by the kidneys.</p>
Topical Therapies	<p>Artificial Saliva</p> <p>Antimicrobial Products</p> <p>Citric Acid Stimulants</p> <p>Note. Topical therapies should be used according to manufacturer's directions</p>

Because PLWH with xerostomia have high rates of dental caries, an aggressive fluoride treatment program should be implemented. Fluoride varnish can be applied after every prophylaxis appointment as well as at the completion of the restorative phase of treatment. The use of prescription fluoride dentifrices is an important tool that can prevent recurrent or new decay. In practice, the use of fluoride containing cavity liners and restorative materials are encouraged to help prevent recurrent caries.

Periodontal Disease

The management of periodontal disease has become a critical element of oral health care for PLWH. While periodontal disease may affect anyone and is very widespread, PLWH can develop rare, severe, and rapidly progressing forms of periodontal infections not commonly seen in the non-immune suppressed population. This section will focus on those forms of periodontal disease and common treatment protocols.

Necrotizing Ulcerative Gingivitis (NUG). NUG is rarely seen in people with an intact immune system. People at risk for NUG include those under extreme stress, smokers, those whose nutrition is particularly deficient, those with extremely poor oral hygiene, and those with immune dysfunction such as that caused by HIV infection. NUG mainly affects the interdental papilla and marginal gingiva. When it is present, the patient's gingiva is often edematous and erythematous with a deeper band of erythema present at the gingival margin. This condition is usually painful, but may present relatively pain free. As it progresses, pseudomembranous areas can be seen along the gingival and interdental papilla as the tissue starts to necrose. A generalized loss of the interdental papilla can develop over time. Patients with these symptoms often experience a metallic taste related to spontaneous hemorrhage of the damaged tissues. This condition may progress rapidly and extend to the underlying bone and supporting structures of the oral cavity.

ORAL MANIFESTATIONS OF HIV



Xerostomia - Early Manifestations

Photo courtesy of Howard Dental



Xerostomia - Late Manifestations

Photo courtesy of Howard Dental



Necrotizing Ulcerative Periodontitis (NUP)

Photo courtesy of Howard Dental

Mountain Plains AIDS Education and Training Center • February 2013



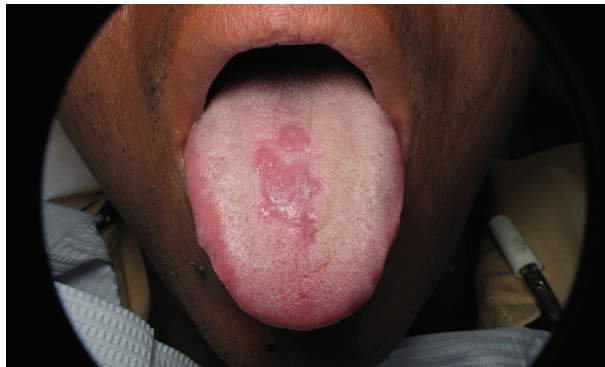
Necrotizing Ulcerative Periodontitis (NUP)

Photo courtesy of Howard Dental



Pseudomembranous Candidiasis

Photo courtesy of HIVdent



Erythematous Candidiasis (median rhomboid glossitis)

Photo courtesy of Howard Dental



Herpes labialis

Photo courtesy of Howard Dental

Mountain Plains AIDS Education and Training Center • February 2013



Hairy Leukoplakia

Photo courtesy of Howard Dental



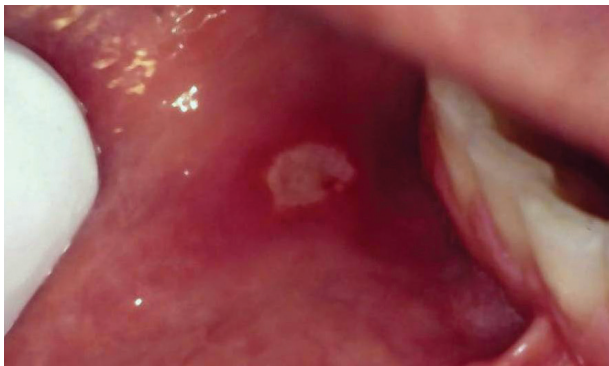
Human Papilloma Virus - Single Lesion

Photo courtesy of Howard Dental



Human Papilloma Virus - Coalesced Lesions

Photo courtesy of Howard Dental



Aphthous Ulcer - Minor

Photo courtesy of Howard Dental

Mountain Plains AIDS Education and Training Center • February 2013



Aphthous Ulcer - Major

Photo courtesy of Dr. John McDowell UCSDM



Squamos Cell Carcinoma

Photo courtesy of Howard Dental



Kaposi's Sarcoma

Photo courtesy of HIVdent



Abnormal fat distribution in lipodystrophy

Photo courtesy of Howard Dental

Table 4. Periodontal Disease Related to Immune Suppression

- **Necrotizing Ulcerative Gingivitis (NUG)**
- **Necrotizing Ulcerative Periodontitis (NUP)**

Necrotizing Ulcerative Periodontitis (NUP). In NUP, the gingiva, alveolar bone, and supporting structures are all compromised, and there is progressive destruction of the periodontium. As in NUG, patients with NUP generally have a fetid mouth odor related to the ongoing necrosis and causative pathogens as well as clinically prominent changes in the appearance and shape of the gingiva. In NUP, however, patients often suffer deep, unrelenting pain in the jaw, and, in severe cases, sloughing of alveolar bony segments and loss of teeth occurs as a result of bone necrosis.

Treatment Protocols

When a patient presents with signs and symptoms of NUG or NUP, the best course of treatment is to act quickly and aggressively.

Treatment includes:

- Local debridement and disinfection using a 0.12% chlorhexidine gluconate
- Antibacterial therapy
- Scaling and root planing as soon as possible
- Antimicrobial rinses
- Oral hygiene/home care instructions and reinforcement
- Nutritional supplementation/advice
- Referral to HIV provider as NUP is a marker of significant immune deterioration

A prescription of metronidazole helps to eradicate the causative pathogens involved in these ulcerative periodontal diseases, but should be used with caution in pregnant women and for men and women who cannot abstain from drinking alcohol. Augmentin or clindamycin may also be used. As soon as the patient can tolerate it, scaling and root planing should be initiated.

Table 5. Antibacterial Therapy for Necrotizing Ulcerative Periodontitis (NUP)

Rx: Metronidazole 250 mg Disp: 28 tabs Sig: Take 2 PO BID until gone (do not drink alcohol while taking this medication)	OR	Rx: Clindamycin 150 mg Disp: 28 Sig: Take 1 QID until gone	OR	Rx: Augmentin 875 mg Disp: 14 for one week or 20 for 10 days Sig: Take 1 BID until gone
AND				
Rx: Chlorhexidine gluconate .12% oral rinse Sig: Swish 15 ml in mouth for 30 seconds and spit out twice a day – do not drink or eat for 30 minutes after rinsing				

Generally, tissue response in a patient who has been treated appropriately for ulcerative periodontitis is excellent. Dramatic improvement is often seen with less pseudo pocketing, minimal bleeding, and somewhat improved gingival architecture. Once causative pathogens have been eliminated, scaling and root planing have been completed, and the patient is determined to be more stable, perio-prophy visits can be scheduled and a more permanent recall protocol implemented. In addition, home care must be fastidious to maintain health.

COMMON ORAL INFECTIONS AND HIV

Fungal Infections

Candidiasis. Candidiasis is the most common intraoral OI in HIV infection. Thrush, or pseudomembranous candidiasis, is usually caused by *Candida albicans*, but there has been an increased incidence of candidiasis due to non-*albicans* species. Patients may complain of pain, altered taste sensations, or halitosis. Oral candidiasis can present in several forms:

- *Pseudomembranous candidiasis* typically has a white, cottage cheese-like, patchy appearance. It is easily wiped off, leaving erythematous and potentially bleeding tissue underneath. It can appear anywhere within the oral cavity and oropharynx.

Table 6. Treatments for Candidiasis

Antifungal rinses	Rx: nystatin oral suspension 5000,000 U Disp. 280 ml Sig. Swish 5 ml (1 teaspoon) in mouth 2 minutes, QID X 14 days
Oral troches or pastilles	Rx: clotrimazole 10 mg Disp. 70 troches Sig. Dissolve 1 troche in mouth 5x/day X 14 days
Systemic therapy	Rx: fluconazole 100 mg Disp. 15 Sig. Take 2 tabs for the initial dose, then 1 tab/day X 14 days For esophageal candidiasis the dose is 400mg for the initial dose and the 200mg for at least 14 days

Table 7. Treatments for Angular Chelitis

Topical antifungal cream	Avoid treatment combinations that include steroidal components, which may further suppress the immune system. Clotrimazole (1%) cream, 2% ketoconazole cream, and nystatin (100,000 units/gram) cream are effective in controlling angular chelitis.
---------------------------------	--

- *Angular cheilitis* may have a number of etiologies (nutritional deficiency, decreased vertical dimension, or local habits coupled with an inflammatory response). In PLWH it is important to assume that these lesions have fungal infiltrates. Angular cheilitis develops at the commissures of lips, and the area can crack easily.
- *Erythematous candidiasis* has a red, flat subtle appearance with inflamed mucosa often accompanied by a burning sensation. It can be associated with acrylic appliances. When treating a patient who wears an appliance, treat the appliance by (a) prescribing nystatin powder to sprinkle in the appliance, (b) soaking the appliance in a weak solution of bleach and water for a few minutes daily, (c) using a 50/50 dilution of water and 0.12% chlorhexidine gluconate, and/or (d) microwaving the appliance.
- *Erythematous candidiasis* in the form of median rhomboid glossitis is fairly unique to PLWH. It appears as a denuded midline surface of the tongue. It is usually accompanied by a strong burning sensation.

Viral Infections

Herpes simplex virus (HSV). Classically, herpetic lesions are found on keratinized tissue or on the vermilion border of the lip. It is important to distinguish herpetic lesions from aphthous stomatitis, as treatments are different. Herpetic lesions should be managed with antiviral therapy and not be treated with ste-

Table 7. Treatment for Oral HSV

Systemic Therapy	Rx: Acyclovir 400 mg Disp.30 Sig. Take 1 tab TID X 10 days
Topical Therapy for lip lesions	Rx: Acyclovir 5% Apply to affected area every 3-4 hours for 4 days Rx: Penciclovir 1% Apply to affected area every 2-3 hours for 4 days

roids. A thorough history, especially in terms of the presence of vesicles, will help distinguish the two. A treatment option for oral herpetic lesions is systemic acyclovir.

Oral Hairy Leukoplakia (OHL). OHL is characterized by whitish corrugated patches, usually along the lateral border of the tongue, that cannot be wiped off like those associated with candidiasis. It is associated with the Epstein-Barr virus, usually does not require treatment, and is considered benign. It can be treated with antiviral medication, but usually resolves with ART.

Human Papilloma Virus (HPV). HPV is the cause of oral warts/condylomas. Lesions can be cauliflower in appearance or flat and condylomatous. They can be singular or multiple. Oral warts are not associated with oncogenic types. One pilot study did find that patients who presented with oral warts were significantly more likely to have high risk types present, although this is thought to be due to the mode of transmission.

Table 8. Treatment for Aphthous Stomatitis

Dexamethasone Elixir 0.5mg/5ml

Disp. 100 ml

Swish 1 tsp in mouth for 1 minute 3 - 4 times/day, and then spit out. Do not drink or eat for 30 minutes after application.

Lesions can be removed but they often recur. HPV, as discussed in the next section, has been identified as a risk factor for squamous cell carcinoma and, therefore, requires careful monitoring.

Aphthous Stomatitis

Aphthous ulcers usually appear on non-keratinized tissues such as the buccal mucosa and oropharynx. They appear as a white or gray pseudomembrane surrounded by an erythematous halo and can be severe in people with advanced HIV disease. There is no known etiology, but aphthous outbreaks have often been associated with stress, trauma, and spicy food. Lesions may be minor or major, single or multiple. Major lesions can persist for several weeks but minor lesions usually heal within 7-10 days. Lesions can be very painful. Dexamethasone Elixir is an effective treatment.

ORAL AND OROPHARYNGEAL CANCERS AND HIV INFECTION

Squamous Cell Carcinoma

The most common type of oral cancer is squamous cell carcinoma, which accounts for 90% of all oral cancers. Salivary gland tumors, sarcomas, melanomas, lymphomas, and metastases

can also occur in the oral cavity. High-risk sites for malignancy include the tongue, followed by the floor of the mouth, the oropharynx, salivary glands, and the lips.

The landscape of oral malignancy is changing in the general population as well as in PLWH. Risk factors for squamous cell carcinoma have traditionally been identified as age, gender, and tobacco and alcohol use. The demographics of oral cancer and especially squamous cell carcinoma increasingly include younger people who do not have the traditional risk factors of tobacco and alcohol use. The risk factor most commonly associated with this group is infection with HPV, which is also associated with cervical cancers.

HPV is a sexually transmitted viral infection. Because PLWH have a high incidence of HPV, it may be assumed that they are at increased risk for HPV-related squamous cell carcinoma. This presents a treatment dilemma. When is it prudent to remove and biopsy HPV lesions, especially considering high rates of reoccurrence as well as the cost involved? Lesions that are situated in the posterior of the mouth and are flat, coalesced, and multifocal in nature are most likely to be precancerous and should be carefully scrutinized and prioritized for biopsy. The good news associated with HPV-related oral carcinomas is that the prognosis for survival is higher than with

non-HPV related oral carcinomas. As with all patients, a thorough cancer-screening exam at every recall appointment is imperative

Kaposi's Sarcoma (KS)

KS, a vascular neoplasm associated with the human herpes virus 8 (HHV-8), has been of special concern since early in the HIV epidemic. Epidemic (AIDS-related) KS is the most common oral malignancy seen in association with HIV disease. KS lesions can appear purple, red, or blue; they come in a variety of shapes and sizes. KS will often resolve with appropriate ART and should be followed by infectious disease and oncology specialists.

POST-EXPOSURE PROPHYLAXIS (PEP)

The potential of personal exposure to HIV, hepatitis B virus (HBV), and/or hepatitis C virus (HCV) in the dental office are legitimate concerns for oral health care providers. It is important to know the facts about occupational exposure including risk and post-exposure care.

Risk. Saliva is not considered infectious for HIV, but blood in the saliva can be infected with a variety of viruses. Factors that are considered in assessing the risk caused by an occupational exposure include (a) the extent of the injury, (b) whether it involved a hollow bore needle, (c) the amount of blood present, and (d) the donor patient's viral load.

- HBV is the most infectious of the viruses that can cause hepatitis. It has an infection rate as high as 30%. The HBV

vaccine is effective, and all health care workers, including dental personnel, should be vaccinated prior to providing clinical care.

- HCV has an infection rate of 1.8%. No vaccine is presently available, and there is no drug regimen available for PEP at this time.
- The infection rate for HIV is .03%, and transmissions to health care providers have been rare. PEP includes protocols for antiretroviral medications that further decrease the risk to .01%.

Post-exposure care. The CDC publishes guidelines for care after occupational exposure to HIV, HBV, and HCV. In all cases, clinicians with expertise in this area should be consulted. In general, these are Infectious Disease and HIV care specialists in the community. The National Clinicians' Consultation Center (NCCC) Post-Exposure Prophylaxis Hotline (PEPline), a 24-hour hotline with up-to-date information on managing occupational exposure to blood borne pathogens, can also be consulted by calling 1-888-448-4911.

Considerations after an exposure include:

- The exposure site should be immediately washed with an antimicrobial soap and water. Harsher materials such as alcohol or peroxide are not recommended because they can cause tissue damage.
- Avoid trauma to the site: do not squeeze or rub the area.

- The donor patient, if known, should be informed of the situation and asked for permission to be tested for HIV, HBV, and HCV. Most patients will agree to this if they are provided with appropriate information and assured that their test results will be confidential. If the patient's tests are negative for HIV, HBV, and/or HCV, and s/he does not have risk factors, the risk is negligible. If test results are positive or unavailable it must be assumed that there is a potential for infection and PEP should be considered.
- PEP guidelines for HIV include an algorithm to determine the extent of risk and the appropriate interventions (if any). Key components of care include:
 - PEP therapy for HIV includes a 28-day course of ART. PEP should be initiated as soon as possible, preferably within 2 hours of the exposure.
 - PEP prescribers should discuss medication side effects with the exposed person. These include fatigue, headache, nausea, and general malaise. Methods to decrease the impact of these side effects should also be discussed. Liver function tests and complete blood counts should be assessed 2 weeks and 4 weeks after treatment is initiated. Workers' Compensation should cover the expenses for ART, lab work, and related clinic visits.

Testing for HIV, HBV, and HCV should be conducted at the time of exposure, and 6 weeks, 3 months and 6 months post exposure. Any new seroconversions during this time indicate that the infection likely occurred as a result of an occupational exposure. Workers' Compensation will cover the cost of care when/if an occupationally acquired infection causes disability.

CONCLUSION

HIV infection can cause major oral health problems, which are especially worrisome because they can lead to malnutrition, communication problems, pain, and changes in body image. Oral health care providers are key members of the team of clinicians who work with PLWH; they make significant contributions to the HIV-infected person's quality and quantity of life. We hope that the information in this guide will assist in the treatment of your patients with HIV infection.

RESOURCES

AETC National Resource Center; www.aidsetc.org

Provides listings of regional AETCs, training materials, clinical resources, and training opportunities.

AIDSinfo; www.aidsinfo.nih.gov

A service of U.S. Department of Health and Human Services (DHHS); provides information on HIV treatment, clinical care, and current treatment guidelines. 1-800-HIV-0440 (1-800-448-0440)

AIDS InfoNet; www.aidsinfonet.org

Provides fact sheets on treatments, prevention, social services, and web resources; easy to print, appropriate for patient and clinician education; updated on a regular basis. Most fact sheets are available in English and Spanish, as well as other languages.

HIV Dent www.hivdent.org

Information on oral manifestations of HIV, infection control, PEP protocols, pediatric/adolescent care, medications, large picture gallery, other resources.

HIV InSite www.hivinsite.org

Sponsored by University of California, San Francisco. Provides search capabilities in broad science, prevention, and treatment spectrum.

Infectious Disease Society of America (IDSA)

www.idsociety.org

Information on practice guidelines, journal publications, conferences, advocacy, public policy, and other resources related to infectious disease.

Mountain Plains AIDS Education and Training Center (MPAETC)

www.mpaetc.org

Education, technical assistance, and consultation education about HIV infection for health care providers; education materials available on Web site.

National Clinicians' Post-Exposure Prophylaxis Hotline (PEPline)

www.nccc.ucsf.edu

24-hour hotline with up-to-date information on managing occupational exposure to blood borne pathogens.

1-888-448-4911

National HIV/AIDS Telephone Consultation Service (Warmline)

www.nccc.ucsf.edu

National HIV telephone consultation service for providers offering clinical information and individualized consultations from clinicians experienced in HIV care.

1-800-933-3413

BIBLIOGRAPHY

- Akpan, A., & Morgan, R. (2002). Oral candidiasis. *Post Graduate Medical Journal*, 78, 455-459.
- Aldridge, E., & Cunningham, L.L., Jr. (2010). Current thoughts on treatment of patients receiving anticoagula therapy. *Journal of Oral Maxillofacial Surgery*, 68, 2879-2887. doi:10.1016/j.joms.2010.04.007
- AIDS Institute New York State Department of Health and Johns Hopkins University School of Medicine. (2001). *Oral health care for people living with HIV infection*. Retrieved from http://www.aidsctc.org/pdf/guidelines/oral_guidelines.pdf
- American Academy of Orthopaedic Surgeons and the American Dental Association. (2012). *Prevention of orthopaedic implant infection in patients undergoing dental procedures: Evidence-based guideline and evidence report*. Retrieved from: http://www.aaos.org/research/guidelines/PUDP/PUDP_guideline.pdf
- Aminoshariae, A., & Kulilid, J. (2010). Premedication of patients undergoing dental procedures causing bacteremia after total joint arthroplasty. *Journal of Endodontics*, 36(6), 974-977. doi:10.1016/j.joen.2010.03.027
- Asp, M., Baucum, D., & Shetty, K., (2009). Dental management of the anticoagulated HIV patient. *HIV Clinician*, 21(2), 8-10.
- Centers for Disease Control and Prevention. (2012). *Guidelines for the use of antiretroviral agents in HIV-1 infected adults and adolescents*. Retrieved from <http://aidsinfo.nih.gov/guidelines/html/1/adult-and-adolescent-arv-guidelines/0/>
- Centers for Disease Control and Prevention. (2001). *Updated U.S. Public Health Service guidelines for the management of occupational exposures to HBV, HCV, and HIV and recommendations for postexposure prophylaxis*. Retrieved from <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5011a1.htm>
- Cleveland, J.L., Lunger, M.L., Saraiya, M., Markowitz, L.E., Dunne, E.F., & Epstein, J. (2011). The connection between human papillomavirus and oropharyngeal squamous cell carcinomas in the United States: Implications for dentistry. *Journal of the American Dental Association*, 142(8), 915-924.
- Denning, P., & DiNenno, E. (2010). *Communities in crisis: Is there a generalized HIV epidemic in impoverished urban areas of the United States?* Retrieved from <http://www.cdc.gov/hiv/topics/surveillance/resources/other/poverty.htm>
- Firriolo, J.F., & Hupp, W. (2012). Beyond warfarin: The new generation of oral anticoagulants and their implications for the management of dental patients. *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology*, 113(4), 431-441. doi:10.1016/j.oooo.2011.10.005
- Gomez-Moreno, G., Anguilar-Salvatierra, A., Martin-Piedra, M.A., Guardia, J., Calvo-Guirado, J.L., Cabrera, M., Castillo, T. (2010). Dabigatran and Rivaroxaban, new oral anticoagulants, new approaches in dentistry. *Journal of Clinical and Experimental Dentistry*, 2(1), e14-e18.

- Greenspan, D. (1998). *Oral manifestations of HIV disease*. Retrieved from <http://hivinsite.ucsf.edu/InSite?page=kb-04-01-14>
- Marks, G., Gardner, L.I., Craw, J., & Crepaz, N. (2010). Entry and retention in medical care among HIV-diagnosed persons: A meta-analysis. *AIDS*, 24, 2665-2678. doi:10.1097/QAD.Ob013e-32833f4b1b
- Office of National AIDS Policy. (2010, July). National HIV/AIDS strategy for the United States. Retrieved from <http://www.whitehouse.gov/sites/default/files/uploads/NHAS.pdf>
- Rautana, J., & Syrjanen, S. (2011). Human papillomavirus infections in the oral mucosa. *Journal of the American Dental Association*, 142(8), 905-914.
- Reznik, D. (2005). Perspective: Oral manifestations of HIV disease. *Topics in HIV Medicine*, 13(5), 143-148.
- Ritter, A.V., & Patton, L. (2007). HIV/AIDS and oral health. *Journal of Esthetic and Restorative Dentistry*, 19(5), 297-298. doi:10.1111/j.1708-8240.2007.00122.x
- Rossie, K., & Guggenheimer, J. (1997). Oral candidiasis: Clinical manifestations, diagnosis and treatment. *Practical Periodontics and Aesthetic Dentistry*, 9(6), 635-641.
- Triantos, D., Porter, S.R., Scully, C., & Teo, C.G. (1997). Oral hairy leukoplakia: Clinicopathologic features, pathogenesis, diagnosis and clinical significance. *Clinical Infectious Disease*, 25, 1392-1396. doi:10.1086/516131
- Younai, F.S., & Vincent-Jones, C. (2009). Oral health and HIV infection: A chronic disease model. *Journal of the California Dental Association*, 37(11), 811-819.



Mountain Plains AIDS Education and Training Center
University of Colorado • Anschutz Medical Campus
303.724.0867
www.mpaetc.org