



Principles of Oral Health Management for the HIV/AIDS Patient



Dental Alliance for AIDS/HIV Care (DAAC)



Edited and Compiled by:

Stephen N. Abel, D.D.S., M.S.
David Croser, B.D.S., D.G.D.P. (UK)
Stuart L. Fischman, D.M.D.
Michael Glick, D.M.D.
Joan A. Phelan, D.D.S.

2000 Edition



Workshop Leaders

Barbara Gerbert, Ph.D.
Barbara F. Gooch, D.M.D., M.P.H.
Francina Lozada-Nur, D.D.S., M.S.
Patricia A. Murray, D.M.D., Ph.D.
Mark M. Schubert, D.D.S., M.S.D.



Participants

Stephen N. Abel, D.D.S., M.S.*
Mario Alves, D.D.S., M.S., D.Sc.
Helene Bednarsh, R.D.H., M.P.H.
Peter Catapano, D.D.S.
Denise Cardo, M.D.
Roman Carlos, D.D.S.
Stephen J. Challacombe, Ph.D., B.D.S.,
FRCPPath.
Gary Chiodo, D.M.D.
Jennifer L. Cleveland, D.D.S., M.P.H.
Catalina Costa, D.D.S.
David Croser, B.D.S., DGDGP (UK)
Joel Epstein, D.D.S., M.S.
Giuseppi Ficarra, M.D.
Stuart L. Fischman, D.M.D.
Catherine M. Flaitz, D.D.S., M.S.
James Formaker, D.D.S.
Adi Garfunkel, D.D.S.
Michael Glick, D.M.D.*
Carolyn F. Gray
Deborah Greenspan, B.D.S., D.Sc.*
Robert Hale, B.D.S.
Bryan Harvey, B.D.S.
Mac Hooton, M.D.

Masakazu Ikeda, D.D.S., Ph.D.
Peter Jacobson, Ph.D., D.D.S.
Daniel Johnson, M.D.
Lewis Lampiris, D.D.S., M.P.H.
Tadd Lazarus, M.D.
Debbie Lewis, B.D.S.
Erik Lucht, D.D.S., Ph.D.
Cesar A. Migliorati, D.D.S., M.S.
Allen Milnes, D.D.S.
Enid A. Neidle, Ph.D.
Doug Peterson, D.M.D., Ph.D.
Joan A. Phelan, D.D.S.*
Jens S. Pinborg, Dr. Odont.*
Velia Ramirez-Amador, D.D.S., M.Sc.,
Ph.D.
Francisco J. Ramos-Gomez, D.D.S.,
M.Sc., M.P.H.
David A. Reznik, D.D.S.
Vincent C. Rogers, D.D.S., M.P.H.
James S. Rundle, D.D.S.
James J. Sciubba, D.M.D., Ph.D.*
Carolyn A. Tylenda, M.S., D.M.D., Ph.D.
Isaac van der Waal, D.D.S., Ph.D.
Fariba Younai, D.D.S.

**Indicates participants at large*

Note: Participants' affiliations noted in chapter headings reflect positions held during the development of this document and may no longer be current.

Contents

Acknowledgements

Introduction

Chapter 1 The Health History and Review of HIV-Related Medically Relevant Information

- Setting for Obtaining a Health History 1.2
- Elements of a Health History 1.3

Chapter 2 Special Considerations for Dental Patients with HIV/AIDS

- . General Treatment Planning 2.2
 - Stage of Disease Evaluation and Its Implications 2.3
 - Restorative Considerations 2.4
 - Prosthetic Considerations 2.5
- . Guidelines For Prevention of Oral Disease 2.5
- . Periodontal Considerations 2.7
- . Oral Surgery 2.10
- . Endodontic Considerations 2.13
- . Orthodontic Considerations 2.14
- . Antimicrobial Prophylaxis and Therapy 2.15
- . Management of the HIV-Infected Child 2.17

Chapter 3 Oral Manifestations of HIV Infection: Clinical characteristics, diagnosis and treatment recommendations

- Principles of Diagnosis 3.2
- Infectious Lesions 3.3
- Therapy For HIV Associated Oral Lesions 3.12

Chapter 4 Management and Evaluation of Occupational Exposures to Bloodborne Pathogens and Tuberculosis

- Management of Occupational Exposures to Bloodborne Pathogens 4.2
- Consideration of Post-Exposure Management Issues in Dental Settings
 - Policy Statement 4.7
- PHS Recommendations for Management of Exposure to Blood 4.10
- CDC Recommendations 4.12
- Post-Exposure OSHA Requirements for Evaluation and Follow Up 4.19

Chapter 5 Psychosocial and Ethical Issues Related to Dental Care of Patients with HIV/AIDS

- Six Basic Principles of Health Care Ethics and Professional Behaviors 5.1-5.3



Acknowledgements

The Dental Alliance for AIDS/HIV Care (DAAC) wishes to acknowledge funding from the Division of Community Based Programs in the HIV/AIDS Bureau, Health Resources and Services Administration, U.S. Public Health Service. Additional support was provided by the American Dental Association, Academy of Oral Medicine, AIDS Education and Training Centers, Centers for Disease Control and Prevention (CDC), National Institute of Dental and Craniofacial Research (NIDCR), Pfizer, Inc., Laclede Research Laboratories, Block Drug Corporation, John O. Butler Company, Johnson & Johnson Dental Division and Ross Laboratories. Special appreciation is extended to Bristol Myers-Squibb for continued support for this project.



Introduction

In the fall of 1994, at a continuing education conference entitled **HIV Disease: Considerations for Dentistry**, presented by the Dental Alliance for AIDS/HIV Care (DAAC) and the American Dental Association (ADA), the Principles of Dental Management of the HIV Infected Patient was initially conceived. The program, held at the ADA Headquarters in Chicago, brought together for the first time the speakers and experts who formed the nucleus of dedicated leadership responsible for the production of this guide.

At that meeting, researchers, educators, clinicians and administrators from the United States, England, Denmark and the Netherlands recognized the need for clear guidelines to aid the dental professional in the care of the HIV infected patient. Immediately, they began working together to create the consensus and document that follow. After months of effort and coordination, we are pleased to present these guidelines and to thank the many dedicated professionals for their contributions and support. This document is a group effort. The participants in each working group contributed expertise to the resulting chapters. The final document could not have come forth without the leadership provided by Drs. Gerbert, Gooch, Lozada-Nur, Murray and Schubert. Participants at large, Drs. Abel, Glick, Greenspan, Phelan, Pinborg and Sciubba supported the project throughout the editing task. (Everyone involved with this project was saddened by the death of Dr. Pinborg, whose enthusiasm and vitality encouraged us in the initial phases of the development of this guide.) The editors also wish to express special thanks to Dr. Barry Waterman, HIV/AIDS Bureau, HRSA, Linda Crosby of the Talbot Recovery Center and Rita May of the Oral Health Education Foundation (OHEF) for all their help in the creation of these guidelines.

In addition to the ADA, a number of other organizations and corporations have contributed to the development of this publication. These include the Health Resources and Services Administration (HRSA), Academy of Oral Medicine, AIDS Education and Training Centees, Centers for Disease Control and Prevention (CDC), National Institute of Dental and Craniofacial Research (NIDCR), Pfizer, Inc., Laclede Research Laboratories, Block Drug Corporation, John O. Butler Company, Johnson & Johnson Dental Division and Ross Laboratories. We wish to express gratitude and appreciation to Bristol-Myers Squibb Immunology Division for dedication and support. Additionally, the Ryan White Title III HIV Early Intervention Services Program in the HIV/AIDS Bureau significantly supported our efforts. Without support and assistance this publication would not have been possible.

The development of new therapies for management and treatment of HIV infection has provided renewed hope for people living with this disease. As people with HIV infection live longer and healthier lives, comprehensive dental care will become a routine

part of their health care regime. The goal of this publication is to enable the dental caregiver to provide appropriate oral health care to these individuals and in this manner contribute to an improved quality of life for people living with HIV infection and AIDS.

This document is a reflection of the best data available at the time of presentation but remains a work in progress as new therapies and discoveries are made in the area of HIV/AIDS research. Also, we wish that the reader keep in mind that the data were compiled from scientific literature after careful conference review. When no documented evidence existed, recommendations were based on expert opinions. The resulting guidelines are intended as an adjunct rather than a substitute for professional judgement of the individual clinician.

The Editors

Chapter 1



The Health History and Review of HIV-Related Medically Relevant Information



Workshop Leader:

Mark M. Schubert, D.D.S., M.S.D., Fred Hutchinson Cancer Research Center, Seattle, Washington

Participants:

Adi Garfunkel, D.D.S., Hadassah Hebrew University, Jerusalem, Israel

Mac Hooton, M.D., Harborview Medical Center, Seattle, Washington

Peter Jacobson, Ph.D., D.D.S., University of the Pacific, San Francisco, California

Tadd Lazarus, M.D., New York Medical College, Valhalla, New York

Doug Peterson, D.M.D., Ph.D., University of Connecticut Health Center, Farmington, Connecticut

David A. Reznik, D.D.S., Grady Health System, Atlanta, GA

Patients infected with HIV are medically complicated and their health status can change rapidly, making it especially important that dental professionals obtain a thorough health history. Careful assessment of the patient's health can aid in determination of the potential influences of HIV disease stage on dental treatment planning. To help determine a patient's stage of HIV disease, as much information as possible should be obtained directly from the patient. Patients are usually well-informed as to their status and state. Most can reliably report their medications, their last CD4 count, their viral load and any changes in their overall health. To prepare a complete medical assessment, it may be necessary to obtain information from the patient's primary care physician.

In general, the assessment of the patient's health allows for: a) screening for medical problems, b) assessment of the risks to the patient associated with the provision of dental treatment and c) evaluation of conditions and diseases that may necessitate modification of dental treatment. A health history form for assessing any medically complex patient should be adequate for HIV-infected patients. Additional information specific to HIV disease may be included. In evaluating the HIV-infected patient, concerns can be generally classified as being related to issues of: a) hemostasis, b) infections, c) drug actions and interactions and d) ability to tolerate dental treatment.

Patients may refrain from providing necessary medical information either because they are unaware they are ill or at risk of illness or because they do not realize that their medical condition may affect dental treatment. As a result, dental health care providers

often must probe for information in order to ensure that all relevant health information is gathered.

Prior to requesting any medical information, dentists should obtain a signed consent from the patient (a consent form that is specific for requesting information on HIV-infected patients is included in Table 1.1). A copy of the signed consent should be placed in the patient's chart and the original should be sent to the physician. Dentists and their staff members should be advised that inappropriate exchange of confidential medical information may have significant legal repercussions.

Health histories may be obtained orally or on preprinted forms of varying length and complexity. The taking of a comprehensive health history reflects a commitment by the dental professional to be a health care practitioner rather than just a skilled technician. Dentists and hygienists must therefore understand the reason why particular information is gathered and the treatment implications of the information.

This chapter will elaborate on specific HIV related details of medical/health history that need to be assessed and incorporated into dental treatment plans (see Table 1.2).



SETTING FOR OBTAINING A HEALTH HISTORY

For all patients, whether HIV-infected or not, the location used for collecting the health history can make the difference in whether or not a complete and accurate history is obtained. Patients will discuss their condition more openly in a private, quiet and distraction-free environment. Given the intensely personal and emotional aspects and social ramifications of HIV infection, the need for privacy is intensified. Health history forms are best filled out away from general patient areas so that patients are assured of privacy.

While recognizing the need to discuss the patient's condition where the conversation cannot be overheard by other patients or other inappropriate persons, dentists should avoid creating the impression of segregation or discrimination through isolation. If a patient asks why the interview is conducted in a private location, the dentist should explain that it is an office policy to respect patient confidentiality. A calm, professional and pleasant demeanor is advised when initiating and conducting an interview.



ELEMENTS OF A HEALTH HISTORY

This section describes components of the health history that need to be added or expanded upon when assessing HIV-infected patients. The list of elements to be evaluated are included in Table 1.2 and are discussed below.

Date: The date that a health history is initially obtained or when it is updated must be clearly indicated. It may be appropriate to complete a separate form at follow-up appointments to ensure that the latest and most up-to-date information is obtained.

Personal and Demographic Data: Along with the usual identifying information and registration information it is especially important to obtain the name, address, phone and FAX number for the patient's physician and case manager. These individuals can provide important information about the patient's health that the patient may not be able to provide.

Chief Complaint/History of Chief Complaint: The first interaction between a patient and a dentist involves hearing the patient's chief complaint and the history of the chief complaint (i.e., the reason the patient is seeking dental care and the history of the circumstances that brought the patient to the clinic). Besides gathering the patient's dental and oral health information, this interaction affords the dentist the opportunity to look beyond the patient's symptoms and illnesses and learn more about the patient as a person, including how the HIV infection and associated conditions have affected the patient's life. This tends to help establish trust and rapport between the dentist and the patient, which encourages honest communication. Both the patient and dentist benefit from this relationship. Patients who do not feel comfortable openly discussing these issues with the dentist may withhold information critical to assessment, diagnosis and treatment decisions.

Past Medical History: As for other patients with complex medical conditions, it is vitally important that the dentist thoroughly review the HIV-infected patient's health history, remembering that the patient may also suffer from non-HIV-related illnesses. In order to obtain complete information, pursuing detailed responses to questions may be required.

Date of Last Visit to Primary Care Physician or Provider: As HIV disease progresses, there is an increasing need to assess, diagnose and treat evolving conditions. If a patient has not been seen by his or her primary care provider on a regular basis, he or she should be urged to seek follow-up care. Additionally, if there is concern that the patient's medical status is not clearly established, consideration should be given to postponing elective dental procedures until the patient's status has been appropriately updated.

HIV Test Results: Information should be sought regarding the patient's history of HIV testing, including: a) date of first HIV test, b) date of last negative HIV test (if any) and c) date of first positive HIV test. This information will provide perspective about the patient's disease status, expected disease progression and disease-related complications.

Reason for HIV Test: Determining why the patient was initially tested for HIV may provide important information regarding his or her knowledge and awareness of HIV disease.

Risk Factors for HIV: The manner of HIV transmission is important because of the implications for dental and oral complications, which may be more common among specific transmission categories (e.g. Kaposi's sarcoma with homosexual transmission). Mode of transmission may also have implications for treatment, such as the increased need for antibiotic prophylaxis in individuals with a history of intravenous drug use, coagulopathies among hemophiliacs or the judicious use of narcotics among substance abusers.

HIV Associated Illnesses: Patients should be questioned about diseases associated with HIV infection, including malignancies, pneumonias, mycobacterial and cytomegalovirus infections; as well as specific oral problems such as candidiasis, ulcerations, xerostomia and severe and rapidly progressive periodontal disease.

CD4 Levels: Dates and values for CD4 levels (first count, lowest count and latest count) provide perspective about the progression and stage of the disease and indicate the extent of immune system damage already suffered.

Viral Load: Plasma HIV RNA levels are obtained because they correlate with the magnitude of viral replication and are associated with the rate of CD4 lymphocyte destruction and thus the rate of disease progression. Changes in viral load in response to medications (especially protease inhibitors) should be noted (see Table 1.3).

CBC and Differential (including total white cell, granulocyte, lymphocyte, and neutrophil counts; RBC count and hematocrit; and platelet counts): These counts have obvious implications for a HIV patient's risk for oral and systemic complications, most notably infections and bleeding. Recent test results (< 3 months) should be obtained.

INR: The INR is the current standard for assessing coagulation status.

Current Medications (see Table 1.4): HIV infected patients may be taking many medications with complex dosing regimens. Thus, it is extremely important that the patient provides a list of all current medications, including: a) prescription medications, b) self-prescribed (over-the-counter) medications, c) naturopathic and homeopathic remedies and treatments, d) nutritional supplements, and

e) specially imported or foreign drugs. These medications can indicate the patient's past and present conditions, illnesses and immune status, as well as the potential for drug reactions and drug interactions. In addition, the dentist will need an accurate picture of the patient's drug schedule as this may affect the timing and length of dental procedures (including duration of local anesthesia). (See appendix III).

The list of potential medications HIV-infected patients may be taking can be prodigious. It may be useful to classify them as to a) anti-retrovirals (type and schedule), b) anti-infectives and c) other.

Allergies and Drug Sensitivity: Patients with HIV have an increased risk of allergic and adverse drug reactions as HIV disease progresses. The details of reactions experienced by patients should be ascertained and recorded when trying to discern drug allergies from non-allergic drug reactions.

Infections:

Hepatitis -- HIV-infected patients may be at increased risk of having a number of different types of hepatitis including viral types as well as drug-related hepatitis. Hepatitis, especially if chronic, can alter drug metabolism and increase the risk of coagulopathies. It is important to document the type of infection, risk activity, etc.

Sexually Transmitted Disease (STD) -- STDs in patients infected with HIV may be associated with a more rapid progression of HIV disease as well as deteriorating health from the STD itself (e.g., syphilitic infection may produce neurosyphilis and cardiomyopathy). STD history should be updated regularly to assess patients' high-risk sexual behavior. As was discussed in Chapter 1, if areas of concern are identified, the dentist should be prepared to either discuss reducing risk-behavior or refer patients to individuals who can work with the patient in this area.

Tuberculosis (TB): HIV-infected patients are at increased risk for contracting or reactivating TB. Thus, the TB status of the patient should be determined by the physician and the dates of TB tests recorded. No elective dental treatment should be provided for patients with active TB. Patients with active disease requiring emergency dental treatment should be referred to facilities capable of managing these patients. Noncompliance with medical therapy may result in emergence of resistant strains of *Mycobacterium tuberculosis* and may also allow the patient to remain infectious to others. Known non-compliance with TB treatment should be reported to public health officials and considered for directly observed therapy (DOT). Appropriate questions to ask the patient include:

- When was your last TB skin test?
- When was your last chest x-ray?
- When was your TB diagnosed?
- Have you been prescribed medicine for your TB and, if so, did you follow the instructions and take the medicine as long as you were told to?

- Have you been told you are noninfectious?
- Have you been told you have multiple drug-resistant TB?

Tobacco, Alcohol, Recreational Drug Use: Recording the quantity and frequency of use of these agents is important because of their potential impact on oral and systemic health and direct provision of dental care, regardless of HIV status.

Neurologic Diseases: HIV associated neurologic diseases can significantly impact the patients' mental, behavioral and motor activities. Dentists should be alert for cognitive and psychological changes that might not otherwise be expected in similar non-HIV patients.

Medical Consultations and Requests for Additional Information: After obtaining and reviewing the health history and medical assessment forms of the dental patient with HIV, it may be necessary to communicate with the patient's primary care provider to confirm or clarify information gathered, to request an interpretation of findings or to consult about a potential dental treatment.

Existing Medical Records: For patients with complex or long medical histories, it is often useful to request medical records. This can include copies of hospital charts, clinic records, radiographs, laboratory reports and other documentation. It is important that the request for records include all of the required identifying information (patient's name, birth date, hospital or clinic identification number, social security number and so forth). Requests should be clear and concise regarding the type of information needed and over what time period. Appropriate records to request would include chart notes, pathology reports, laboratory results, etc. Dentists requesting opinions or summaries from the patient's primary care provider should be sure to make the circumstances of their request clear (type of dental care proposed, desire to know the risk of complications for a certain treatment, the steps proposed to prevent complications and so forth). Dentists obtaining information over the phone should be sure to make a clear and complete notation in the patient's chart. The date, time, person consulted and all information exchanged should be included in the chart notation.



SUMMARY

This chapter provides recommendations for assessing the medical status of the patient with HIV, and has reviewed the elements of a thorough health history for patients who are both HIV-infected and HIV(-). Comprehensive oral health care requires an assessment of the patient's medical status, including progression of HIV disease. A broad spectrum of diseases may present in HIV-infected patients and a number of oral

complications might result. A complete health history that is updated at regular intervals, and supplemented by medical consultation, forms the basis for the provision of appropriate and optimal dental care.

Table 1.1

**CONSENT FOR TRANSMITTAL OF HIV-RELATED
INFORMATION***

Name and address of person permitted to disclose information:

.....
.....

Name and address of individual or organization to which the disclosure is to be made:

.....
.....

Name and address of patient:

.....
.....

Purpose of disclosure:

.....
.....

Information to be disclosed:

.....
.....

I,, hereby give my permission for the above mentioned individual and/or organization/hospital/ clinic/laboratory to disclose pertinent medical records to the individual/organization listed above.

I further understand that I may revoke this consent at anytime. Unless revoked earlier by me, this consent expires

Patient's signature:Date.....

Witness's signature:.....Date.....

***Practitioners should determine if this sample consent form meets applicable State codes.**

Table 1.2

HIV Relevant History Questionnaire

Date -

Personal and demographic data (including other health-care providers) -

Chief Complaint -

History of Chief Complaint -

Past Medical History (including last visit to primary care provider) -

HIV Test with Dates:

first HIV test -

last negative HIV test -

first positive HIV test -

Reason for HIV Test -

Risk Factor(s) for HIV -

History of HIV Disease (illnesses, signs and symptoms) -

CD4 Cell Count with Dates:

initial count -

lowest count -

latest count -

Viral Load and Dates:

highest rate -

lowest rate -

latest rate -

Complete Blood Cell Count with a Differential -

Medications with Dosage and Schedules:

antiretrovirals -

anti-infectives -

other -

Allergies and Drug Sensitivity -

Hepatitis (type and status) -

Sexually Transmitted Diseases (type and status) -

Tuberculosis (date of test(s) and present status) -

Tobacco Use (history and present status) -

Alcohol Use (history and present status) -

Recreational Drug Use (history and present status) -

Neurological Diseases -

Table 1.3

CD4 CELL COUNT, VIRAL LOAD AND HIV DISEASE PROGRESSION*

Cell Count	Viral load measurement		Percent of patients with AIDS-defining complications		
	bDNA	RT-PCR	3 years	6 years	9 years
CD4 350	<1000	<3000	-	-	-
	1001-6000	3001-14,000	0	18.8	30.6
	6001-20,000	14,001-41,000	8	42.2	65.6
	20,001-60,000	41,001-110,000	40.1	72.9	86.2
	>60,000	>110,000	72.9	92.7	95.6
CD4 351-500	<1000	<3000	-	-	-
	1001-6000	3001-14,000	4.4	22.1	46.9
	6001-20,000	14,001-41,000	5.9	39.8	60.7
	20,001-60,000	41,001-110,000	15.1	57.2	78.6
	>60,000	>110,000	47.9	77.7	94.4
CD4-500	<1000	<3000	1	5	10.7
	1001-6000	3001-14,000	2.3	14.9	33.2
	6001-20,000	14,001-41,000	7.2	25.9	50.3
	20,001-60,000	41,001-110,000	14.6	47.7	70.6
	>60,000	>110,000	32.6	66.8	76.3

* Adapted from: Mellors JW, Munoz A, Giorgi JV, et al. Plasma viral load and CD4+ lymphocytes as prognostic markers of HIV-1 infection. Ann Intern Med 1997;126:946-954

SELECTED AGENTS USED TO TREAT HIV INFECTION OR RELATED CONDITIONS

TABLE 1-4 SELECTED AGENTS USED TO TREAT HIV INFECTION OR RELATED CONDITIONS		
Agent	Description	Adverse Effects
Acyclovir (Zovirax)	An antiviral used to treat herpes simplex virus 1 and 2 and herpes zoster.	Nausea, diarrhea, headache.
Abacavir (Ziagen)	A nucleoside analogue reverse transcriptase inhibitor anti-retroviral agent.	Hypersensitivity reaction is a serious and potentially fatal side effect. Clinical features include fever, skin rash, fatigue, malaise, gastrointestinal (GI) symptoms, arthralgia, cough and/or dyspnea.
Abacavir/lamivudine/zidovudine (Trizivir)	A combination of three nucleoside analogs.	GI upset, anorexia, insomnia, lab abnormalities, elevated liver enzymes, mild hyperglycemia, elevated triglycerides, headache, malaise, neuropathy, lactic acidosis, severe hepatomegaly with steatosis.
Amprenavir (Agenerase)	A protease inhibitor antiretroviral agent.	GI intolerance, rash, headache, oral paresthesias and fat redistribution. Interactions with many drugs: caution must be used when prescribing in combination with other medications.
Atovaquone (Mepron)	An antiprotozoal agent used to treat <i>Pneumocystis carinii</i> pneumonia.	Rash, nausea, diarrhea, headache. Adverse oral effect: Oral candidiasis.
Azithromycin (Zithromax)	An antibiotic used to treat chlamydia and bacterial infections of the skin and respiratory tract. Used to prevent and treat <i>Mycobacterium avium</i> complex disease.	Nausea, muscle weakness, headache and bone marrow suppression leading to anemia, leukopenia and neutropenia.
Cidofovir (Vistide)	An antiviral used to treat cytomegalovirus infection. Given with saline and probenecid to diminish the risk of nephrotoxicity.	Nephrotoxicity, neutropenia, metabolic acidosis, uveitis and ocular hypotony.

TABLE 1-4 SELECTED AGENTS USED TO TREAT HIV INFECTION OR RELATED CONDITIONS (CONT'D.)		
Agent	Description	Adverse Effects
Ciprofloxacin (Cipro)	An antibiotic used to treat many common bacterial infections. Occasionally used in combination with other drugs to treat <i>Mycobacterium avium</i> complex disease.	GI upset, seizure, rash.
Clarithromycin (Biaxin)	An oral macrolide used to prevent and treat <i>Mycobacterium avium</i> complex disease.	Diarrhea, nausea, abdominal pain (at high doses). Adverse oral effect: Abnormal taste.
Clindamycin (Cleocin)	An antibiotic used as an alternative treatment for <i>Pneumocystis carinii</i> pneumonia and toxoplasmosis.	Diarrhea.
Dapsone	An antileprotic drug used as an alternative in the treatment and prophylaxis of <i>Pneumocystis carinii</i> pneumonia.	Rash, fever, GI upset.
Delavirdine (Rescriptor)	A non-nucleoside reverse transcriptase inhibitor antiretroviral agent.	Rash (which could require drug discontinuation), headaches, and possible increase in transaminases.
Didanosine (ddI, Videx)	An antiretroviral nucleoside analogue reverse transcriptase inhibitor.	Pancreatitis, peripheral neuropathy, seizure, diarrhea. Adverse oral effect: Xerostomia.
Doxorubicin, liposome-encapsulated (Doxil)	An antineoplastic antibiotic used in chemotherapy for advanced Kaposi's sarcoma.	Neutropenia.
Dronabinol (THC, Marinol)	A cannabinoid used to treat wasting syndrome (anorexia, cachexia).	Asthenia, tachycardia, vasodilation, amnesia, anxiety, euphoria, hallucinations, paranoid reaction, somnolence. Adverse oral effect: Xerostomia.
Efavirenz (Sustiva)	A non-nucleoside reverse transcriptase inhibitor antiretroviral agent.	Rash, central nervous system side effects, including confusion, abnormal thinking, impaired concentration, depersonalization, abnormal dreams and dizziness. Interactions with many drugs: caution must be used when prescribing in combination with other medications.
Erythropoietin (Procrit, Epogen)	A glycoprotein that stimulates the production of red blood cells. Used to treat AIDS-related anemias.	Headache, arthralgia, fatigue, fever, diarrhea.

TABLE 1-4 SELECTED AGENTS USED TO TREAT HIV INFECTION OR RELATED CONDITIONS (CONT'D.)		
Agent	Description	Adverse Effects
Famciclovir (Famvir)	An antiviral used to treat herpes simplex and herpes zoster.	Nausea, diarrhea, headache.
Fluconazole (Diflucan)	An antifungal used to treat candidiasis and cryptococcosis.	Nausea, headache, rash, vomiting, diarrhea, prolonged prothrombin time with Coumadin. Adverse oral effect: Erythema multiforme syndrome.
Foscarnet (Foscavir)	A non-nucleoside analogue reverse transcriptase inhibitor used to treat cytomegalovirus infection and acyclovir-resistant herpes virus infections.	Impaired renal function, thrombocytopenia, anemia. Adverse oral effects: Oral ulcers, xerostomia, circumoral fasciculation due to hypocalcemia.
Ganciclovir (Cytovene)	An antiviral used for treatment or prevention of cytomegalovirus retinitis and other types of cytomegalovirus end-organ disease.	Neutropenia, thrombocytopenia, anemia, rash.
Hydroxyurea (Hydrea)	A ribonucleoside reductase inhibitor.	Bone marrow suppression with leukopenia, anemia and thrombocytopenia. GI intolerance, including stomatitis, nausea, vomiting, anorexia, diarrhea and constipation.
Immune globulin	An agent used for treatment of primary immunodeficiencies.	Flushing, headache, dizziness, myalgia.
Indinavir (Crixivan)	A protease inhibitor antiretroviral agent.	Hyperbilirubinemia, kidney stones.
Interferon α -2a (Roferon-A)	A protein that inhibits viral replication; used in treating Kaposi's sarcoma.	Flu-like symptoms, neutropenia, depression, confusion, anemia, paresthesia. Adverse oral effects: Xerostomia, gingivitis.
Interferon α -2b (Intron)	A protein that inhibits viral replication; used in treating Kaposi's sarcoma, hepatitis B and hepatitis C.	Adverse oral effects: Xerostomia, gingivitis.
Itraconazole (Sporanox)	An antifungal used for treatment of blastomycosis, histoplasmosis, and candidiasis.	GI intolerance, rash, pruritis, headache, hepatitis.
Ketoconazole (Nizoral)	An antifungal used to treat oral, vaginal, and esophageal thrush, candidiasis, and cryptococcosis.	Serious liver damage, reduced testosterone levels.

TABLE 1-4 SELECTED AGENTS USED TO TREAT HIV INFECTION OR RELATED CONDITIONS (CONT'D.)		
Agent	Descriptions	Adverse Effects
Lamivudine (3TC, Epivir)	A nucleoside analogue that appears to increase responsiveness to zidovudine in patients with previously zidovudine-resistant virus.	Hair loss.
Lopinavir/Ritonavir (Kaletra)	A combination protease inhibitor antiretroviral agent.	GI symptoms, diarrhea. Interactions with many drugs: caution must be used when prescribing in combination with other medications; elevations in cholesterol and triglycerides.
Megestrol acetate (Megace)	A synthetic progestin used for treatment of wasting syndrome (anorexia, cachexia).	Most serious: hypogonadism, diabetes and adrenal insufficiency. Most common: diarrhea, impotence, rash, flatulence, asthenia, hyperglycemia and pain.
Nelfinavir (Viracept)	A protease inhibitor antiretroviral agent.	Diarrhea or loose stools, fat redistribution, increased levels of triglycerides and/or cholesterol, hyperglycemia, osteoporosis and possible increased bleeding with hemophilia.
Nevirapine (Viramune)	A non-nucleoside reverse transcriptase inhibitor antiretroviral agent.	The major toxicities are life threatening cutaneous and hepatic reactions during the initial 8 weeks of treatment. Patients should be warned to promptly report symptoms of hypersensitivity reaction (fever, rash, arthralgias and myalgias).
Octreotide (Sandostatin)	A synthetic hormone used for controlling diarrhea.	Cholelithiasis or biliary sludge in 15% to 20%; GI symptoms including nausea, vomiting, cramping, and diarrhea. CNS symptoms: headache, dizziness, lightheadedness and asthenia. Hyperglycemia.
Pentamidine (Pentam for IV use; NebuPent for inhalation)	An antiprotozoal agent used in aerosol form as an alternative agent for <i>Pneumocystis carinii</i> pneumonia prophylaxis and in intravenous form for treatment of PCP.	Nephrotoxicity, hypotension, hypoglycemia, leukopenia.
Pyrimethamine (Daraprim)	An oral antiprotozoal drug used in combination with sulfadiazine for the treatment of toxoplasmosis.	Severe allergic reactions and rashes, anemia, leukopenia, thrombocytopenia, insomnia, diarrhea.

TABLE 1-4 SELECTED AGENTS USED TO TREAT HIV INFECTION OR RELATED CONDITIONS (CONT'D.)		
Agent	Description	Adverse Effects
Rifabutin (Mycobutin)	An antibiotic used to prevent and, in combination with other drugs, to treat <i>Mycobacterium avium</i> complex disease.	Neutropenia, eye and muscle irritation, discoloration of skin and urine.
Ritonavir (Norvir)	A protease inhibitor antiretroviral agent.	Elevations in cholesterol and triglycerides. Interactions with many drugs: caution must be used when prescribing in combination with other medications.
Saquinavir (Invirase or Fortovase)	A protease inhibitor antiretroviral agent.	Nephrolithiasis, diarrhea, abdominal discomfort, nausea.
Stavudine (d4T, Zerit)	A nucleoside reverse transcriptase inhibitor antiretroviral agent.	Peripheral neuropathy, panic attacks, insomnia, headache.
Trimethoprim/sulfamethoxazole (TMP/SMX) (Septra or Bactrim)	An antibiotic used to prevent and treat <i>Pneumocystis carinii</i> pneumonia.	Skin rash (which can progress to Stevens-Johnson syndrome), digestive disturbances, bone marrow suppression, liver impairment.
Zalcitabine (ddC, Hivid)	A nucleoside reverse transcriptase inhibitor agent.	Skin rash, peripheral neuropathy. Adverse oral effects: oral ulcers.
Zidovudine (ZDV, AZT, Retrovir)	A nucleoside reverse transcriptase inhibitor agent. Recommended as the first agent to be used when antiretroviral therapy for AIDS is initiated.	Bone marrow suppression leading to anemia, leukopenia or neutropenia, nausea, muscle weakness, headache.
Zidovudine/Lamivudine (Combivir)	A combination of two reverse transcriptase inhibitors.	See zidovudine and lamivudine

*Excerpted from Dental Standards of Care Committee: *Oral Health Care for People with HIV Infection: Clinical Guidelines* : New York, NY: New York State Department of Health AIDS Institute; 2001

SELECTED BIBLIOGRAPHY

Glick M. Dental management of patients with HIV. Quintessence Publishing Co, Inc. Carol Stream, Il. 1994

Fauci AS, Bartlett JG, Goosby EP, Smith MD, et al. Guidelines for the use of antiretroviral agents in HIV-infected adults and adolescents. Department of Health and Human Services. 1997 (Draft)

Carpenter C, Feinberg M, NIH Panel. Report of the NIH panel to define principles of therapy of HIV infection. Department of Health and Human Services. 1997

Chapter 2



Special Considerations for Dental Patients With HIV/AIDS



Workshop Leader:

Patricia A. Murray, D.M.D., Ph.D., San Mateo, California

Participants:

Mario Alves, D.D.S., M.S., D.Sc., University of Illinois at Chicago, Chicago, Illinois

David Croser, B.D.S., DGD (UK), Riverside Community Healthcare, Chelsea and Westminster Hospital, London, United Kingdom

James Formaker, D.D.S., Green/LeBaron Dental Treatment Center, Los Angeles, California

Robert Hale, B.D.S., Brocklebank Health Centre, London, United Kingdom

Erik Lucht, D.D.S., Ph.D., Infektionstandkliniken, Huddinge, Sweden

Cesar A. Migliorati, D.D.S., M.S., Public Oral Health Clinic, Zurich, Switzerland

Fariba S. Younai, D.D.S., David B. Kriser Dental Center, New York City, New York

Participants in Pediatric Dentistry Subgroup Workshop:

Peter Catapano, D.D.S., Bellevue Hospital, New York City, New York

Catherine Flaitz, D.D.S., M.S., University of Texas-Houston Dental Branch, Houston, Texas

Francisco J. Ramos-Gomez, D.D.S., M.Sc., M.P.H., University of California-San Francisco, San Francisco, California

Masakazu Ikeda, D.D.S., Ph.D., Kanagawa Children's Medical Center, Yokohama, Japan

Daniel Johnson, M.D., University of Chicago, Chicago, Illinois

Allen Milnes, D.D.S., Dip. Paed, Ph.D., F.R.C.D., University of Toronto, Toronto, Ontario, Canada

INTRODUCTION

The principles of good oral health care are the same for people with HIV as they are for all dental patients. There is no evidence to support alterations in oral health care solely on the basis of HIV status. This chapter describes selective considerations for treating patients with HIV, including recommendations for comprehensive treatment planning and considerations for patient referral.

In planning treatment for the patient with HIV, dentists must first consider the patient's current physical status and prognosis for HIV disease progression. This is a necessary consideration, similar to that made when assessing other medically compromised patients with potentially life-threatening diseases. Providing dental care and treatment for the patient with HIV can affect the quality of his or her life. The priorities of treatment should be adjusted accordingly.

Treatment planning for the patient with HIV follows the same sequence as with other patients. Priorities are to:

1. Alleviate pain
2. Restore function
3. Prevent further disease
4. Consider esthetic results

Each patient must be assessed individually. HIV disease is multifactorial with a spectrum of oral and systemic clinical effects. A comprehensive analysis of a patient's physical status cannot be overemphasized when planning treatment.



GENERAL TREATMENT PLANNING

Although there is no justification for modification of dental treatment based solely on a patient's HIV status, there are treatment considerations unique to the HIV-infected population. The general guidelines are as follows:

1. General oral health can affect overall systemic health. For example, a caries free and periodontally healthy mouth decreases the microbial burden on an already compromised immune system.
2. Modification of the care of patients with HIV is similar to that of other medically compromised patients (e.g. diabetics require special consideration because of their impaired response to bacterial infections, as well as delayed healing).
3. A proactive attitude toward the dental treatment of patients with HIV is recommended. Consequently, emphasis must be placed on prevention (discussed later in this chapter).
4. Planning and prioritization of dental treatment are important, requiring individual assessment. The results of the assessment may sometimes require deviation from the usual sequence of a dental treatment plan.

Honest communication between dentist and patient helps determine treatment options and an appropriate treatment plan. Although the dentist must always try to

provide the best oral care possible, the patient's desires and expectations should be considered, especially for patients with end-stage HIV disease.

The nutritional status of the patient may also affect the overall treatment plan. For instance, patients with rampant caries require dietary analysis and may benefit from dietary counseling to decrease carbohydrate intake or from strategies to increase salivary flow. Some patients with HIV suffer from a lack of appetite and are malnourished as a result. If malnutrition is suspected, dental patients should be counseled in the use of dietary supplements and referred to their physicians for management.

Stage of Disease Evaluation and Its Implications

In order to plan appropriate treatment, a person's overall medical status as well as HIV status must be assessed, as outlined in Chapter 2.

Early Stage

Asymptomatic patients with HIV who have CD4 counts greater than 200 are defined as being in the early stages of the disease. These patients should be treated the same as patients who are HIV negative. There is no evidence to suggest that treatment modifications are necessary at this stage.

Late Stage

When the CD4 count falls below 200, patients are considered to have progressed to later stages of the disease. Most of these patients may still be treated by the general practitioner. Occasionally, referrals for consultation and for treatment outside the expertise of the general practitioner may be necessary, providing an opportunity for "shared care." Other than for those procedures that are usually done in a hospital setting regardless of HIV status, referring patients to a hospital setting for dental care can only be justified by the medical status, not the dental procedure.

Disease progression in patients with HIV requires periodic reassessment. When caring for an HIV-infected person, the dentist must continuously monitor dental and oral health for symptomatic manifestations of the disease. The ongoing evaluation process helps the dentist identify the symptomatic patient and allow for appropriate medical intervention which may affect the course of HIV disease.

In addition to talking to the patient to ascertain the stage of HIV disease, consideration should be given to the following:

1. Patient's ability to keep appointments and withstand treatment.
2. Patient's ability to comply with and understand instructions.
3. Patient's financial resources and ability to invest in dental care.

Patients may miss appointments for a variety of reasons, including difficulty obtaining transportation to the office, orthopedic impairments or dementia that may result in the forgetting of post-operative instructions, medication, schedules, etc. In order to minimize the risk of a cancellation or a "no show", it is wise to determine and accommodate the patient's best time for appointments and schedule accordingly.

Extra efforts may be required. For instance, it may be useful to provide all instructions and appointments in written form and to involve the patients' caregivers. Even with written instructions, additional steps may be necessary, for example, a reminder by phone twenty-four hours before and on the day of appointment. Flexibility in scheduling appointments may also be needed to accommodate patients' medication schedules, especially since multiple drug therapy may require patients to take medication at very frequent intervals, sometimes with and sometimes before meals.

The chronically ill patient is faced with many demands on limited financial resources. In addition to contemplating potentially expensive long-term care, health maintenance and prevention must be funded. Private health insurance, Medicaid and Medicare programs do not generally provide extensive oral health care benefits. Professional advice in developing a financially appropriate dental treatment plan is an important part of patient counseling. The patient must be able to physically comply with, and have financial resources to pay for, medically necessary oral health care.

Restorative Considerations

Restorative considerations are the same for patients with HIV as they are for the general dental population. Patients not considered good candidates for extensive restorative procedures include those with the following conditions:

- Rampant caries (root or coronal).
- Reduced salivary flow.
- Oral acidity from frequent vomiting.
- Oral manifestations of HIV disease, such as poorly controlled recurrent ulcers or herpetic infections.
- Nonambulatory and terminal patients require simplified treatment options. (Glass ionomer is a particularly useful material for restoring teeth in these patients).

The combination of periodontal disease, reduced salivary flow, exposure to gastric fluids and poor oral hygiene increases the likelihood of root caries. When these conditions are present, they must be addressed (along with their cause) and, whenever possible, treated or eliminated before further restorative treatment is initiated.

When restorative procedures are indicated, the choice of restorative materials will largely be dictated by the patient's desires, the dentist's preferences, the constraints of their application and the financial resources available to the patient.

Prosthetic Considerations

An esthetic prosthesis is of immeasurable value for people with debilitating, terminal diseases, as facial appearance and the smile remain fundamental to self-esteem. In such patients, prosthetic treatment should be completed as quickly as possible. Prosthetic treatment for the HIV population is similar to prosthetic treatment for the elderly population—both groups may be prone to candidiasis, xerostomia and wasting syndrome. An acrylic partial denture can prove a good option for a patient with a questionable dental prognosis.

Summary of Main Considerations Relating to General Treatment

Asymptomatic patients with HIV can be treated the same as any other dental patient. At this stage of HIV disease, the immune system is still generally intact. Disease progression needs to be continuously monitored and treatment plans adjusted accordingly. The number of patients who need to have their treatment plan modified is relatively small, and these patients are typically in later stages of disease progression. Recent anti-retroviral therapy reduces these numbers even further.

Dialogue should be established with the patient's primary care physician to optimize the comprehensive treatment of the patient and to facilitate the exchange of information to monitor disease progression.



GUIDELINES FOR PREVENTION OF ORAL DISEASE

A recent study by Veterans Administration Hospital dentists concluded that of 2,191 patients with HIV examined in the United States, 79% required some type of routine dental care, regardless of the stage of infection. A focus on prevention in patients with HIV may eliminate or reduce oral complications during the progression of the disease, preserving and improving the patient's oral health and overall quality of life.

In addition to lesions of the oral mucosa, individuals with HIV may develop other oral problems resulting from changes in the specialized protective mechanisms of the oral environment. Such changes include: alteration of the mucosal barrier; decreased salivary secretion; altered composition of saliva; and changes in the commensal microbial flora. These changes can lead to: xerostomia, dysgeusia (distortion of taste), ageusia (loss of taste), anosmia (loss of smell), dysphagia (difficulty or pain on swallowing) and loss of appetite.

Preventive practices include:

- Detecting oral manifestations associated with HIV,

- Instituting appropriate treatment and referring for medical care if necessary.
- Instituting oral preventive protocols for all patients, whatever their stage of HIV infection. There are two phases. 1. A primary program consisting of early identification of caries-susceptible oral environments and restoration of carious lesions. 2. A secondary program including identification of risk factors for caries, dietary counseling, patient education in oral hygiene procedures and home care, application of topical fluoride and periodic recall examinations for supportive therapy.
- Becoming active in the community by establishing close working relationships with social agencies and medical care facilities that provide services to patients with HIV.
- Participating in community screening programs, with the objective of early diagnosis of oral manifestations of HIV infection.
- Educating other health care professionals (physician, nurse, dental hygienist, social worker, caretaker) to increase their understanding of the oral complications associated with HIV infection.

General Prevention Recommendations

The dental clinician must stress good oral hygiene and home care procedures (brushing, flossing, mouth rinses). On a case-by-case basis, the dentist should establish a plan for periodic office visits for oral examinations and periodontal supportive therapy. These procedures constitute fundamental standards of care and facilitate the early diagnosis of oral disease. In addition, smoking is a potential risk factor for periodontal disease and oral precancerous and cancerous lesions. Ideally, patients should be counseled to quit or reduce smoking, and a smoking cessation program should be considered.

Reduced Salivary Flow (Xerostomia or "dry mouth")

A dry mouth enhances caries development, periodontal disease and soft tissue infection. It also affects the patient's quality of life by making speaking, chewing and swallowing difficult. When reduced salivary flow is diagnosed in the HIV infected patient, a treatment program consisting of replacement or stimulation of saliva should be instituted. Secretory stimulants (Pilocarpine, Salagen®, Bethanecol®), as well as saliva substitutes (e.g Oral balance®, Xerolube®, Salivart®, Unimist®), will provide lubrication of the oral tissues, ease patient discomfort and enhance local defensive barriers.

Caries

Reduced salivary secretion and function and poor diet (especially a carbohydrate-rich diet frequently associated with recreational drug use) can predispose patients to rampant dental caries. If recurrent caries cannot be adequately controlled, extensive crown and bridge restorations should not be contemplated.

Periodontal Disease

Prevention of periodontal disease is aided by dentists and staff members who consistently emphasize and monitor good oral hygiene and home care. Patients with HIV infection should have a regular periodontal examination to detect emerging problems needing treatment. This topic is addressed in detail later in this chapter.

Candidiasis and Other Oral Lesions

Persistent or nonresponsive candidiasis, oral ulcers, herpetic lesions or neoplasms may have a significant impact on the dental treatment plan. For example, individuals with these conditions are poor candidates for full or partial dentures. It is essential to use all possible measures to restore and retain teeth in these patients. This may be an opportunity to consider shared care with a specialized clinic.

Special Considerations During Pregnancy

Women who are pregnant and HIV infected should be counseled about the importance of maintaining immaculate oral hygiene in the prevention of caries and periodontal disease. The counseling and the preventive measures should be the same as used for non-HIV infected pregnant women.



PERIODONTAL CONSIDERATIONS (See Table 2.1 and 2.2)

Chronic adult-type periodontitis is common in the HIV-infected patient population. In addition, unique forms of periodontal disease have been reported. The clinical presentation and their association with HIV led to the names "HIV-gingivitis" and "HIV-periodontitis". Later in the course of the HIV epidemic, HIV was dropped from the names. As a result of international meetings held between 1990 and 1992, new terminology emerged. Specifically, HIV-gingivitis was renamed linear gingival erythema (LGE) and HIV-periodontitis was renamed necrotizing ulcerative periodontitis (NUP). In addition, necrotizing ulcerative gingivitis (NUG), also known as ANUG, was also shown to be associated with HIV infection in some patients. The progression and relationship between NUG and NUP is currently unclear; however, it appears that they most likely represent different severities of the same pathological process.

While these unique forms of periodontal disease in patients with HIV may coexist with chronic, adult-type periodontitis, they tend to be more aggressive and may appear as one of the earliest manifestations of HIV infection. Thus, the ability of the dental practitioner to consistently recognize the periodontal lesions uniquely associated with HIV infection is important.

Linear Gingival Erythema (LGE): clinical appearance and treatment

LGE often manifests as a subtle periodontal change and may go unnoticed to the untrained eye. The defining features of LGE include an established marginal gingivitis accompanied by a distinct linear red band of the marginal attached gingiva. In addition, after the patient improves oral hygiene and receives root planing and scaling, LGE frequently fails to resolve. However, there is no ulceration and no clinical attachment loss associated with LGE. Furthermore, pain is rarely associated with this lesion.

Treatment of LGE is directed at preventing this lesion from progressing to the more severe NUP. The treatment protocol includes instruction in improved oral hygiene and thorough root planing and scaling. Patients are typically placed on chlorhexidine rinses twice a day indefinitely, and are recalled every three months.

For the nonresponsive patient, treatment with topical antifungal agents or fluconazole tablets can accompany the chlorhexidine rinse regimen. These agents often help to reduce the gingival erythema and petechia-like lesions characteristic of LGE. Prescriptions for topical therapy include Nystatin® vaginal tablets (5,000 units each) or Mycelex® troches (10 mg clotrimazole each); one tablet or lozenge five times daily for fourteen days. Systemic treatment includes Diflucan® (fluconazole 100 mg), two tablets the first day and then one tablet per day for two weeks.

Necrotizing Ulcerative Gingivitis (NUG) and Necrotizing Ulcerative Periodontitis (NUP): Clinical Appearance and Treatment

NUG has been defined as destruction of one or more interdental papillae. In the acute stage of the process, ulceration, papillary necrosis, and sloughing may be seen. It appears that NUG may be a precursor stage of NUP. Consequently, differentiating between NUG and NUP may be difficult.

The chief characteristics of NUP include pain, gingival bleeding, loss of attachment and occasionally exposure of bone. Soft-tissue cratering and interproximal necrosis and ulceration are seen in direct association with the regions of bone loss. Although NUP can occasionally appear generalized, it is most frequently seen as a localized lesion with areas of severe, soft-tissue necrosis surrounded by areas of normal tissue. Studies suggest that NUP is more commonly seen in patients with CD4-cell counts less than 200.

The clinical appearance of NUP may vary widely. Early lesions typically appear to be NUG, with little or no radiographic evidence of bone loss, and minimal tooth mobility. Moderate NUP usually involves the entire attached gingiva with exposure and partial sequestration of bone to the mucogingival junction. Severe NUP manifests as extensive necrosis of the soft tissue and underlying alveolar bone, extending past the mucogingival junction, with obvious radiographic evidence of bone loss and significant mobility.

The best and most effective treatment of NUG/NUP involves mechanical debridement to eliminate microbial accumulations to the greatest degree possible. The same guidelines used in the management of general periodontal diseases apply: scaling of gross deposits followed by meticulous scaling and root planing, oral hygiene instruction, chemotherapeutic agents and a good prevention program with frequent recall visits.

At the first visit, the priority is to alleviate the patient's symptoms. Thorough mechanical debridement, removal of calculus, bacteria, and necrotic tissue should be accomplished as soon as possible. The use of 10% povidone-iodine is suggested during the irrigation and debridement procedure to help control patient discomfort and bleeding. Povidone-iodine has antimicrobial activity against certain oral bacteria and fungi, improves early periodontal wound healing, and provides some topical anesthesia. Patients should then be instructed in oral hygiene procedures, with emphasis on diligent compliance.

The next phase of treatment starts after evaluating the need for chemotherapeutic agents. Antibiotics are usually indicated if fever, severe necrosis, exposure of bone or severe pain are present. Metronidazole, 250 mg, four times daily for five days, is the preferred drug for adults because it is effective against the anaerobic organisms associated with NUG and NUP and assists in resolving the acute pain and infection associated with HIV-periodontitis. Alcohol consumption is incompatible with this medication. If any patient history of severe liver damage or allergy to metronidazole exists, penicillin may be used, although penicillin is only minimally effective in reducing pain and recurrence of symptoms may result. For patients allergic to penicillin, clindamycin 150 mg, three times daily for seven days, is the preferred treatment. Erythromycin is not recommended as it has proven ineffective in the management of HIV-related periodontal lesions.

The use of antibiotics can result in an overgrowth of *Candida*. Therefore, the need for topical antifungal agents must be assessed and monitored accordingly. Therapy with antifungal agents such as clotrimazole troches (10 mg, five times daily) or nystatin vaginal tablets (100,000 U, three times daily) is usually adequate.

In addition to antibiotics and antifungal agents, twice daily home use of a 0.12% chlorhexidine oral rinse is recommended for preventing and controlling plaque formation, breaking up existing plaque and inhibiting and reducing the development of gingivitis.

If a patient is in severe pain or has a fever during the dental examination, a follow-up observation appointment twenty-four hours later is recommended. After the acute gingival inflammation resolves, meticulous root planing and scaling may begin. This is usually done quadrant by quadrant with anesthesia, and may require several visits.

After therapy is completed, the long-term management of patients with HIV and periodontal disease must be considered. This requires maintenance of excellent oral hygiene and frequent dental visits for supportive periodontal therapy. Monthly visits,

followed by three-month recall visits when the periodontal condition has stabilized, are recommended.

Periodontal lesions that fail to respond to correctional therapy must be evaluated further, usually by biopsy for a definitive diagnosis. For example, cytomegalovirus infection and Kaposi's sarcoma have been shown to mimic acute periodontitis. Also, oral non-Hodgkin's lymphoma may show a striking resemblance to NUG or NUP. Other unusual complications of NUP, such as oroantral fistulas, have also been noted. Therefore, it is important that clinicians be cognizant of all intraoral pathologies frequently encountered in immunosuppressed patients and include them in their differential diagnoses.

Summary of Periodontal Considerations

Patients with HIV infection are at an increased risk for an atypical form of gingivitis and rapidly progressive severe periodontal disease. Dental management centers around early identification of lesions and prevention of further periodontal deterioration. With knowledge of diagnosis and treatment of HIV-related periodontal conditions, the educated practitioner can identify NUG and NUP lesions and can successfully treat even advanced lesions resulting in an overall improved quality of life for patients with HIV.



ORAL SURGERY

Treatment Planning Guidelines

The decision to perform dental extractions and other oral surgical procedures for patients with HIV should be based on the same criteria as for all patients. If a questionable health status influences anticipated oral surgery, the dentist must consult with the patient's physician. Surgical procedures, in particular, are associated with excessive bleeding and an increased risk of infection. Therefore, all procedures must be performed in a manner that minimizes bleeding and avoids bringing oral pathogens into the deeper fascial planes and oral spaces. Improvements in oral hygiene should be encouraged, when necessary, together with preoperative scaling to minimize the risk of postoperative complications.

Treatment planning must be done on an individual basis. Unusual factors may sometimes influence surgical decisions, making an individualized assessment necessary in every case. For example, teeth with a poor prognosis may be maintained instead of extracted if a patient is deemed a poor candidate for tooth replacement. On the other hand, infected teeth are sometimes identified as the source of continuous bacteremias, and a partial or full denture may be advantageous and well-tolerated by the patient. However, chronic oral lesions, such as severe oral candidiasis, could make the choice of a denture inappropriate

Post-Operative Complications and Antibiotic Prophylaxis

There appear to be no significant differences between the number of post-operative complications in patients with HIV infection versus uninfected patients.

There are little scientific data to support the routine use of antibiotic prophylaxis following oral surgery in patients with HIV disease. The consensus of the workgroup participants of *Dental Alliance for AIDS/HIV Care (DAAC): Principles of Dental Management for the HIV-infected Dental Patient* is that the clinical decision to prescribe antibiotic therapy should be made on an individual, case-by-case basis. There is no support in the literature for basing the decision exclusively on a low CD4+ cell count. However, as most oral surgery procedures are invasive, patients with CD4+ cell counts below 100 cell/mm³ should be evaluated for neutropenia. If the neutrophil count is below 500 cells/mm³, patients should receive antibiotics preoperatively and postoperatively.

Antibiotics should be used judiciously in patients with HIV disease because of a higher propensity for developing adverse drug reactions, especially during the more advanced stages of the disease. Furthermore it has been established that indiscriminate use of antibiotics in patients with HIV disease may put them at risk of developing opportunistic infections such as candidiasis.

Extractions

One of the more common complications associated with an extraction is “dry socket” (localized osteitis), which occurs in 3%-4% of all extractions among the general population. Studies to date suggest that this complication rate is similar in the HIV-positive group.

The incidence of postoperative complications in all patients is associated with and affected by many factors, including: the type and site of the tooth extracted; the number of teeth to be extracted; high counts of intraoral aerobic and anaerobic bacteria; age of the patient; whether or not the patient smokes and the experience of the surgeon. All of these factors must be considered whenever extractions are contemplated.

For all patients, regardless of HIV status, the use of aseptic and atraumatic surgical techniques is essential to minimize the introduction of pathogens into a surgical wound and to reduce postoperative complications. Preoperative scaling of the teeth to be extracted may also help reduce the rate of postoperative infections, and should be considered in tandem with educating and motivating patients to improve their oral hygiene. A more recent study has shown that the application of an intra-alveolar socket medicament may help reduce the incidence of postoperative complications in patients with HIV. This study suggested that this simple measure should be considered for those patients with known risk factors or a previous history of complications.

Bleeding Tendencies

Practitioners should keep in mind that, although rare, excessive bleeding can occur even if hemostasis appears normal. Immune thrombocytopenia is a known complication of HIV disease.

For patients undergoing extensive surgical procedures and those with increased bleeding tendencies, a full hemostatic function assessment should be performed before surgery. Dental extractions can be safely performed in patients with HIV disease who have platelet counts above 50,000/mm³. However, oral surgery procedures should be postponed, if possible, when hemoglobin levels fall to 7.0 g/dL or below.

If no tests are available and if extractions must be performed immediately, a simple bleeding time test can be performed by the dentist to determine whether the patient's hemostatic function is acceptable. An increased bleeding time (>9 minutes) indicates a need to assess quantitative and qualitative platelet function.

Implant Surgery

Although there has been relatively little research into the effects of providing dental implants for individuals with HIV, it appears that implant surgery can be successfully provided for many patients. Studies to date have demonstrated no difference in the rate of postoperative complications or osseous integration for implant patients with or without HIV infection.

The benefits of improved function and quality of life need to be assessed carefully, together with a review of the patient's general health before embarking on a long and intensive treatment plan.

Summary of Oral Surgery Considerations

- Close collaboration with patient's physician is recommended.
- Routine antibiotic prophylaxis is contraindicated.
- Hemostatic function assessment is recommended before extensive surgery for those with increased bleeding tendencies.
- Implant surgery may be performed successfully in patients with HIV infection. The benefits of such treatment should, however, be assessed carefully in relation to HIV disease stage.
- Aseptic and atraumatic techniques should be used to minimize the introduction of pathogens and postoperative complications.
- Improvements in oral hygiene should be encouraged, when necessary, together with preoperative scaling to minimize the risk of postoperative complications.

- Use of a prophylactic, intra-alveolar socket medicament after oral surgery may prevent delayed healing in patients with HIV. This is a consideration for patients with a history of delayed healing or those having multiple extractions.
- Removal of partially erupted third molars in the absence of oral disease may be necessary to reduce the possibility of problems later in the course of the patient's HIV disease (especially in younger patients).

ENDODONTIC CONSIDERATIONS

Neither HIV infection nor AIDS are contraindications for endodontic treatment, including pulpotomy. Indeed, as in many other cases of immunosuppression (transplants, dialysis etc.), endodontic treatment and the retention of natural teeth offers numerous advantages for patients with HIV. Endodontic treatment does not appear to be associated with an increase in postoperative complications and does not warrant routine pre- or post-procedural antibiotics.

Advantages of endodontic therapy:

- Preservation of self-esteem.
- Maintenance of mastication and nutrition.
- Facilitation of oral hygiene.
- Reduction in the likelihood of bacteremia, septicemia, endocarditis and encephalitis caused by periapical infections.
- Sparing select patients from the surgical trauma of extraction.

In planning endodontic therapy, the following factors should be considered:

- Patient's physical ability to complete the treatment and other factors that may affect compliance.
- Periodontal complications.
- Periodontal-endodontic or endo-periodontal lesions.
- Restorability of the tooth.
- Contraindications for extraction.
- Patient esthetic concerns.

In cases of acute pulpitis, endodontic treatment must be performed immediately to eliminate the risk of periapical infection and other complications. This is especially important when surgical treatment cannot be performed because of systemic limitations (e.g., coagulation concerns). One-step endodontic therapy should always be considered in cases of acute pulpitis or when patients with physical limitations are unable to return for multiple visits. Patients requiring antibiotic premedication should also be treated by one-step endodontic therapy. This technique is also recommended when periapical acute or chronic infections require antibiotic therapy and the patient has a history of oral candidiasis or any other fungal infection.



ORTHODONTIC CONSIDERATIONS

There are no reported studies of orthodontic treatment performed on patients with HIV disease. General as well as oral health greatly influence the success of orthodontic treatment, but there is no evidence that HIV infection is a contraindication. Patients with undiagnosed HIV infection have received successful orthodontic treatment, suggesting that asymptomatic HIV-infected patients respond to orthodontic treatment in the same manner as do noninfected orthodontic patients.

The factors to consider in planning orthodontic treatment are the same for patients with HIV infection as for all patients and include the patient's overall health, stage of disease, and oral health, his or her ability to comply with appointments and treatments and the presence of oral lesions and their possible effect on treatment.

Late-stage AIDS, like certain leukemias, uncontrolled diabetes or any other debilitating systemic disease, is a primary contraindication for extensive orthodontic treatment. For minor tooth movement, the health of patients with HIV/AIDS should be carefully evaluated, as these patients may have labile health even when they appear to be in good physical condition.

The final decision to provide extensive orthodontic treatment should include a consultation with the physician in charge of the patient's care to evaluate the patient's overall health. Time required for treatment should be considered during the initial patient evaluation, with a consideration of the patient's life expectancy.

Before initiating any type of orthodontic treatment, the mouth should be carefully evaluated for the following:

- Presence or history of periodontal or dental disease.
- Presence of some HIV-related pathological conditions such as candidiasis, Kaposi's sarcoma, recurrent aphthous ulcers, necrotizing gingivitis or periodontitis. Control of the lesion should be established before commencing orthodontic treatment.

Patient compliance must also be considered. The patient's mental status and drug or alcohol dependency should be carefully evaluated before treatment.

Modifications to orthodontic treatment

In some cases, orthodontic treatment may be modified for the patient with HIV. For example, appliance therapy is an option to reduce length of time and to provide faster results. In addition specific modalities can be chosen that avoid stress on teeth. Combined restorative and orthodontic treatment are another available alternative.



ANTIMICROBIAL PROPHYLAXIS AND THERAPY

The spread of infection, both primary (e.g. necrotizing ulcerative periodontitis) and secondary (e.g., postextraction), is of great concern for dental clinicians when treating patients with HIV. Unfortunately, over-treatment with prophylactic antibiotics is common, precipitating both adverse reactions and the development of bacterial resistance. Adjunctive antibiotic prophylaxis during routine dental therapy is not currently supported by the literature. The decision to use antibiotics either to augment dental therapy or to prevent infection secondary to the delivery of care should be determined as a result of individual patient evaluation.

This section delineates the indications for antimicrobial use in patients with HIV disease and provides recommended regimens. The recommendations in this section are intended to be used as general guidelines and do not replace preexisting recommendations that are in common use (e.g. American Heart Association recommendations for bacterial endocarditis prophylaxis). Also, these recommendations are designed to supplement, not replace, the clinical judgment of the dentist.

Prophylactic Use of Antibiotics

Published studies have not supported the routine prophylactic use of antibiotics during dental treatment for patients with HIV. This applies to all aspects of dental care, including oral surgery and highly invasive procedures. In one study of male patients having teeth extracted, HIV-positive patients healed as quickly as did HIV-negative patients, suggesting that HIV-positive patients were in no greater need of antibiotic prophylaxis than the general population. This notion was further supported by another study which compared postextraction complications in HIV-positive patients to those in HIV-negative patients and concluded that post-extraction complications in HIV-positive patients were rare. However, a more recent study found that the prophylactic intra-alveolar application of a medicament (chlortetracycline, aspirin, cinchocaine, and amethocaine) was useful, in promoting healing in patients with HIV when compared with the intra-alveolar application of a placebo. This finding may not be unique to patients who are HIV-positive, as patients who are HIV-negative were not included in this study. A study of post scaling bacteremia described antibiotic prophylaxis as unnecessary in patients with HIV-associated LGE and NUP. A more recent study of endodontic therapy in patients with HIV also found no evidence to support the routine use of antimicrobials.

The consensus recommendation of the participants in this working group is that antibiotic prophylaxis is generally unnecessary for dental treatment, including invasive surgical therapy, except for those conditions outlined by the American Heart Association. Furthermore, antibiotic medications should not be initiated based solely on the patient's CD4 cell count or any other marker of immune function. The only exception to this general rule is patients with HIV disease who have severe neutropenia (< 500 cells/mm³). One possible sequellae of antiretroviral chemotherapy, neutropenia, predisposes patients to bacterial infections, oral ulcers and periodontal diseases. Neutropenia is also more common in patients with CD4 cell counts below 100 cell/mm³. If neutropenia is suspected, it is important to obtain preoperative neutrophil counts.

Moderate neutropenia (absolute counts between 500 and 1000/mm³) requires the judgment of the practitioner. Patients with HIV disease and moderate neutropenia do not require antibiotic prophylaxis for most dental procedures. Invasive procedures, such as root planing and periodontal surgery, may be accompanied by systemic antibiotics, followed by topical antimicrobials to prevent secondary infections. Necrotizing, ulcerative gingivitis and periodontitis are also definite indications for both systemic and topical antimicrobial therapy.

Severe neutropenia (absolute counts < 500/mm³) is a definite indication for prophylactic antimicrobials for all dental procedures. It is also an indication for an oral health maintenance program that incorporates topical antimicrobials, such as chlorhexidine, with frequent recall appointments. Bactericidal antibiotics are the preferred drug for patients with neutropenia, as bacteriostatic antibiotics given to patients with low white blood cell counts may result in enhanced bacteremia. In cases where significant neutropenia exists, it is advisable to consult with the patient's physician for recommendations regarding antibiotics. This is especially important because many patients with advanced disease are already taking various medications, including antibiotics, that may already be protecting them from the dissemination of oral bacteria.

Some patients are currently being treated with intravenous medications on an outpatient basis and have indwelling catheters to facilitate drug administration. The literature does not clearly recommend antibiotic prophylaxis before dental therapy in patients with indwelling catheters (such as Hickman's). Most indwelling catheters that fail do so as a result of infections with skin-associated bacteria, not oral-associated bacteria. However, in all cases the patient's physician should be consulted.

Therapeutic Use of Antibiotics

When an oral infection is present, systemic antibiotics followed by topical antimicrobials are indicated for invasive procedures such as extraction, root planing and periodontal surgery. Antimicrobials commonly used in dentistry can be grouped in two categories: topical and systemic (Table 2.3).

Topical antimicrobials have a long history of use in dentistry for both disease prevention and as therapeutic adjuncts. Chlorhexidine is an effective antimicrobial mouth rinse that has been used in Europe for more than 40 years and in the United States since 1987. Topical tetracycline, used as a mouth rinse, has recently found renewed applications for HIV-infected patients. ListerineTM, an essential oil-based antimicrobial mouth rinse, is the only nonprescription mouthwash with American Dental Association approval as an antimicrobial.

Dentists must carefully select systemic antimicrobials for use in the HIV-infected dental patient. Table 3 contains regimens for systemic antimicrobials in order of recommended use. Head and neck infections, especially of dental origin, are mixed anaerobic infections. Metronidazole has been shown to be effective against such infections. In addition, resistance to this antibiotic is uncommon; bacteria are either innately susceptible or not. Alterations of the normal flora are rare with metronidazole

compared to broad spectrum antibiotics and, thus, subsequent overgrowth with fungal opportunists (for example, *Candida*) is unlikely. In the absence of contraindications, metronidazole should be the systemic antimicrobial drug of first choice for use in the patient with HIV. Clindamycin also works well for mixed anaerobic infections and has fewer contraindications for use in children. Therefore, clindamycin is the systemic antimicrobial of choice for the pediatric dental patient.

When analgesic, antibiotic, corticosteroid or any other therapy is necessary because of acute or chronic periapical infections or adverse reactions to dental treatment, it is very important to contact the patient's physician before administering or prescribing any medication. Without this consultation, dental practitioners may be uninformed about possible drug resistance, tolerance, side effects or interactions with other medications already being taken by the patient. There is a risk of surpassing the patient's threshold ability to metabolize multiple drugs or large doses of a drug. When this overloading occurs, it may provoke kidney or liver failure with consequent fatal toxic shock. This may also occur in patients with kidney or liver insufficiency. Doses of medications must be adjusted to the patient's ability to metabolize them, otherwise overdosing may occur.

Specific indications for antimicrobial therapy related to the management of the dental patient with HIV include:

- Prophylaxis for the prevention of infections in dental patients with HIV disease who have neutropenia.
- Adjunctive treatment of HIV-related oral infections.

Summary of Antimicrobial Prophylaxis Considerations

- Patients with CD4 cell counts below 100 cells/mm³ and patients on long-term anti-retroviral chemotherapy should be evaluated for neutropenia.
- Patients with absolute neutrophil counts below 500 cells/mm³ should receive antibiotic prophylaxis before dental therapy.
- The dentist is advised to consult the physician for patients with indwelling catheters and neutrophil counts between 500 and 1,000 cell mm³.
- Bactericidal antibiotics are the most appropriate antibiotics for prophylactic treatment.

Local Anesthetics

There are no contraindications related to the use of local anesthetics in patients with HIV disease. However, in patients with a history of poor hemostasis, it is advisable to avoid deep block injections. In these cases, local infiltration is appropriate.



MANAGEMENT OF THE HIV-INFECTED CHILD

Given the increasing frequency of pediatric HIV infection, all dental health care providers must familiarize themselves with the early diagnosis of pathological conditions of the mouth and the recommended management strategies for the treatment of children with HIV. *The principles of good oral health care are the same for children with HIV as they are for all dental patients. There is no evidence to support alterations in oral health care solely on the basis of HIV status.*

When treating a child with HIV, the general dentist or pediatric dentist should adopt an active, prevention-oriented stance and have a policy of frequent and thorough oral examinations so that the HIV-related oral complications can be identified and treated at their earliest possible stages. This active approach to patient management may reduce the incidence of oral infections, improve caries control and facilitate implementation of an effective preventive program.

The Pediatric Dentist as Part of the Overall Care Team

The dental needs of children infected with HIV are best coordinated within the framework of the complete medical team. An active approach to oral management requires that the pediatric dentist communicate regularly with all members of the child's medical management team in order to ensure that the oral screening becomes part of the case management plan for each patient.

Specific situations that may require consultations with the child's physician:

- When antibiotic prophylaxis is required (especially important for children with heart valve abnormalities, significant neutropenia, children already on antibiotics or other medications).
- When oral surgery is planned.
- When other procedures that may induce bleeding are planned.
- When prescribing medication. (Existing medications could interact with those newly prescribed.)
- When the emotional status of the family and child indicates an evaluation is needed.

Preventive Services

Preventive dental services should be an important part of every child's oral health and are key to active treatment. Prevention is even more important for children who, because of immunosuppression or the side effects of medical treatment, may be more susceptible to oral disease. Other than the need for increased vigilance, preventive services are no different for children with HIV than for those without medical complications.

Preventive services for children should include:

- Dental education and counseling as part of prenatal and perinatal care.
- Preventive dental education and counseling of adult caregivers responsible for health care of the child with HIV.
- Preventive dental counseling of medical and nursing colleagues.
- Frequent periodic oral health examinations (1-3 months).
- Placement of pit and fissure sealants, when appropriate.
- Appropriate use of systemic or topical fluorides.
- Appropriate use of antimicrobials for plaque-associated diseases.

The formation of dental plaque may be substantially controlled by mechanical and chemical means. Chlorhexidine rinses are recommended when manual dexterity alone is not adequate for plaque control. Younger children (less than 6 years of age) often require the assistance of an adult in performing oral hygiene procedures.

The focus on oral health prevention and promotion should include the verification of community water fluoridation and the application of topical fluorides where necessary. Topical or systemic fluoride supplements for home use should be dispensed according to the American Academy of Pediatric Dentistry (AAPD) Guidelines [source: American Academy of Pediatric Dentistry, 1995], which recommend fluoride mouth rinses twice daily for 1 minute. These mouth rinses are effective in remineralizing incipient enamel lesions, which can be important in patients with salivary dysfunction. The use of fluorides, including fluoride dentifrices and fluoridated pit and fissure sealants, has proven to be effective in preventing caries in immunocompromised children. It is essential that the pediatric dental team monitors total fluoride intake to avoid fluorosis of the teeth. (See recommendations of the ADA's Council on Dental Therapeutics [CDT].)

There is no evidence for a direct correlation between HIV infection itself and caries patterns, although caries is related to eating practices and drug treatments in children with HIV.

Preventive services should also include counseling of medical and nursing colleagues.

Prophylactic Antibiotic Recommendations for Children

Children with HIV, like all children, require regular general dental care and some may require oral surgical procedures. There are no studies to date addressing the possible need for antibiotic prophylaxis in children, nor are there published studies indicating that children with HIV are at high risk for bacterial complications after routine dental procedures.

Children with hypogammaglobulinemia or low CD4 counts (CD4<100 cells/mm³) warrant special concern with regard to antibiotic prophylaxis. At this time, antibiotic prophylaxis is not recommended for these patients unless there is history of recurrent bacterial infections. (Ideally, patients with hypogammaglobulinemia will be receiving monthly doses of immunoglobulin.) Exceptions to this recommendation are those situations in which prophylaxis is the standard of care for all patients. For example, the endocarditis prophylaxis regimen for patients with heart anomalies, either congenital or acquired, as recommended by the American Heart Association.

Children with CD4 counts below 100 cells/mm³ and children on long-term antiretroviral therapy need to be evaluated for neutropenia. Children with absolute neutrophil counts below 500 cells/mm³ should have dental procedures deferred until their neutropenia has resolved. If this is not possible, then antibiotic prophylactic recommendations should be made based on the indication for the procedure, on the previous or concurrently administered antibiotics and on the presence or absence of oral infection.



CONCLUSIONS

All dentists should be able to provide routine dental care for the adult or child with HIV disease. Generally, most patients with HIV disease are best served by receiving general dental treatment when needed. Unless a dental patient is extremely neutropenic, thrombocytopenic or in medical distress, he or she is usually able to tolerate routine dental care and procedures, including oral surgery. As in any immunocompromised patient, the elimination of dental and oral infections, as well as the use of prophylactic measures, may be an important adjunct to the maintenance of oral health. A regularly scheduled periodontal prophylaxis to eliminate plaque and calculus is a highly beneficial service for patients with HIV disease. In addition, the routine daily use of an antimicrobial rinse, such as chlorhexidine, may be a valuable adjunct.

The extent of restorative, periodontal, and surgical services depends upon several factors related to the patient's disease state. Good judgment and prudent application of techniques are important in treating the HIV-positive patient, just as they are in treating any other patient. There are no prescribed rules as to when or when not to treat an oral condition. Each patient's oral health care needs and the appropriate level of dental care must be assessed individually.

Table 2.1

Features of HIV-Associated Periodontal Diseases
(LGE) Linear gingival erythema • Fiery red linear band, 2mm • Diffuse or petechial redness • Minimal response to therapy not associated with CD4 cell counts (NUG) Necrotizing ulcerative gingivitis • Also known as ANUG • Gingival pain • Profuse gingival bleeding • Feter oris • No involvement of osseous tissues • Associated with stress, anxiety • Co-factors: malnutrition and smoking (NUP) Necrotizing ulcerative periodontitis • Severe, deep pain • Spontaneous gingival bleeding • Extensive soft-tissue necrosis • Severe loss of periodontal attachment • Rapid onset and progression • Exposed osseous tissues • Associated with low CD4 cell counts

Table 2.2

Treatment of NUG and NUP
• Debride affected area using povidone-iodine irrigation • Reinforce oral hygiene • Prescribe metronidazole, 250 mg, 4 times a day, for 5 days • Prescribe antifungal agents and analgesics if needed • Prescribe 0.12% chlorhexidine mouthrinse twice daily • Schedule observation appointment 24 hours later • Re-appoint for root planing and scaling by quadrant • Recall patient every four weeks until stabilized

Table 2.3

Antimicrobial Regimens*			
Antimicrobial	Daily Dosage	Duration (Days)	Comment
Topicals			
Chlorhexidine 0.12%	20 mL BID 30s	7	Regimen may be individualized based upon clinical judgment. Contains alcohol (11%)
Tetracycline 1%	20 mL BID 30s	7	Regimen may be individualized based upon clinical judgment.
Listerene®	20 mL, BID 30s	7	Contains alcohol (28%)
Systemics			
Metronidazole	250mgQID	7	Contraindications: alcohol pregnancy, warfarin, liver dysfunction
Augmentin®	250mgTID	7	Indicated if beta lactamase producing bacteria suspected
Clindamycin	150mgTID	7	Indicated for pediatric cases, Contraindications: history of colitis, > 60 years of age
Penicillin VK	500mgQID	>7	Contraindications if history of recent or multiple use
Doxycycline	200mg initial 100mgQD 100mgQD	≥7	Contraindicated if aminoglycoside resistance aminoglycoside suspected

* Medical history review for prior use for allergies or drug interactions; administration of systemic antibiotics should be coordinated with primary care physician if required.

SELECTED BIBLIOGRAPHY

- American Academy of Pediatric Dentistry (special issue). Reference Manual 1994-95;16.
- Asher RS, McDowell J, Acs G, Belanger G. Pediatric infection with the human immunodeficiency virus (HIV): head, neck, and oral manifestations. *Spec Care Dent* 1993;13:113-6.
- Barr CE and Toorosaian JP. Oral manifestations in a hospitalized group of AIDS and ARC patients. *Lancet* 1985;2: 8501.
- Bawden J. Changing patterns of fluoride intake: proceedings of a workshop at the University of North Carolina. *J Dent Residency* 1992;71: 1212-65.
- Centers for Disease Control. Classification system for human immunodeficiency virus (HIV) infection for children under 13 years of age. *MMWR* 1087;36: 225.
- Cooper H. Root canal treatment on patients with HIV infection. *Intl Endodo J* 1993; 26: 369-71.
- Dodson TB. HIV status and the risk of post-extraction complications. *J. Dent. Res.* 1997;76: 1644-52
- EEC Clearinghouse on Oral Problems Related to HIV Infection and WHO Collaborating Centre on Oral Manifestations for the Human Immunodeficiency Virus. An update of the classification and diagnostic criteria of the oral lesions in HIV infection. *J Oral Pathol Med* 1991;20: 97-100.
- EEC Clearinghouse on Oral Problems Related to HIV Infection and WHO Collaborating Centre on Oral Manifestations for the Human Immunodeficiency Virus. Classification and diagnostic criteria for oral lesions in HIV infection. *J Oral Pathol Med* 1993;22: 289-91.
- Ficarra G, Shillitoe E. HIV-related infections in the oral cavity. In: *Critical Reviews in Oral Biology and Medicine*. 1992;3: 207-31.
- Gerner N, Hurlen B, Dobloug J, et al. Endodontic treatment and immunopathology of periapical granuloma in AIDS patient. *Endodont and Dental Traumatol* 1988; 4: 127-31.
- Glick M, Abel S, Muzyka B, Delorenzo M. Dental complications after treating patients with AIDS. *JADA* 1994;125: 296-301.
- Glick M, Abel S. Dental implants and HIV disease. *Implant Dent* 1993; 2: 149-50.
- Hurlen B, Gerner N. Acquired immune deficiency syndrome (AIDS)--complications in dental treatment. *Intl J Oral Surg* 1984; 3: 148-50.
- Katz MH, Mastrucci M, Leggott P, et al. Prognostic significance of oral lesions in children with perinatally-acquired HIV infection. *Am J Dis Child* 1993;147: 45-8.
- Leggott P. Oral manifestations of HIV infection in children. *Oral Surg Oral Med Oral Pathol* 1992;73: 187.
- Lucartorto F, Franker C, Maza J. Postscaling bacteremia in HIV-associated gingivitis and periodontitis. *Oral Surg Oral Med Oral Pathol* 1992; 73: 550-4.
- Murray PA. Management of HIV-associated diseases. *Dent Teamwork* 1989;97-9.
- Murray P. HIV disease as a risk factor for periodontal disease. *Compend Contin Educ Dent* 15: 8. 1994
- Ramos-Gomez R, Greenspan JS, Greenspan D. Orofacial manifestations and management of HIV infected children. *Oral and Maxillofac Surg Clin North Am* 1994; 6:37-47.

Robinson P, Cooper H, Hatt J. Healing after dental extractions in men with HIV infection. *Oral Surg Oral Med Oral Pathol* 1992; 74: 426-30.

Robinson P. Periodontal disease and HIV infection: a review of the literature. *J Clin Periodont* 1992;19: 609-14.

Ryder MI. Periodontal considerations in the patient with HIV. *Current Opin Periodontol* 1993; 43-51.

Winkler JR, Murray PA. A potential intraoral expression of AIDS may be rapidly progressive periodontitis. *J Calif Dent Assoc* 1987;15:20-4.

Chapter 3



Oral Manifestations of HIV Infection: Clinical characteristics, diagnosis and treatment recommendations



Workshop Leader:

Francina Lozada-Nur, D.D.S., M.S., University of California-San Francisco, San Francisco, California

Participants:

Roman Carlos, D.D.S., University Carlos Marroquin, Guatemala City, Guatemala

Stephen J. Challacombe, Ph.D., B.D.S., FRCPath, Guy's Hospital/University, London, United Kingdom

Catalina Costa, D.D.S., Centro de Referencia e Treinamento-AIDS, Secretaria de Estado da Scede, Sao Paulo, Brasil

Joel Epstein, D.D.S., M.S., University of British Columbia, Vancouver, Canada

Giuseppi Ficarra, M.D., University of Florence, Florence, Italy

Catherine M. Flaitz, D.D.S., M.S., University of Texas-Houston, Houston, Texas

Velia Ramirez-Amador, D.D.S., M.Sc., Ph.D., University Autonoma Metropolitana-Xochimilco, Ciudad de Mexico, Mexico

Isaac van der Waal, D.D.S., Ph.D., Free University Hospital/ACTA, Amsterdam, The Netherlands

INTRODUCTION

Oral manifestations may be the first sign of HIV infection and thus may lead to testing and a diagnosis of HIV infection. Oral conditions may also develop as immunosuppression progresses, causing signs and symptoms that require management. Furthermore, certain oral manifestations in HIV-infected patients are associated with the risk for the development of AIDS or may be the first AIDS defining condition.

The oral conditions discussed in this section are not specific to HIV-infection or AIDS and may be found in other immunocompromised patient populations. However, in the context of HIV infection the lesions may behave differently and may be of increased

duration and severity. Some lesions are rare in nonimmunocompromised patients and thus may be highly suggestive of HIV infection.

This section will describe an approach to the diagnosis and recommendations for the treatment options of oral mucosal lesions associated with HIV disease. It will focus on the common oral lesions that primary dental care providers may expect to see. These providers may not be familiar with the use of medications required for the management of HIV-associated oral lesions. It must be remembered that referral to experienced providers may be required for diagnosis and appropriate management. Those with special interest in HIV-associated oral disorders will find sections discussing therapeutic approaches for management.



Principles of Diagnosis

A history of the chief complaint, a careful history (medical and social/high risk behavior) and a thorough head and neck and intra-oral examination are essential in the formulation of a differential diagnosis, leading to the development of a provisional and, eventually, a definitive diagnosis. On the basis of a provisional diagnosis, treatment may be initiated or additional testing or referral may be appropriate. Diagnostic techniques chosen will be affected by the regional availability of support services.

Principles of Therapy

The provider must be trained or experienced in the use of any medication prescribed, including its potential side effects and drug interactions. Medications should be prescribed only after the development of a provisional diagnosis. The dose, frequency and duration of therapies chosen should be based upon established guidelines and the pharmacology of the medication. The prescription of the medication may be modified by the severity of the clinical condition, the medical status of the patient, response to therapy and the onset of adverse side effects. Factors to consider when treatment is not effective include: the diagnosis may be incorrect, the medication may be ineffective or the dosage inadequate, the condition or infective agent may be resistant to the therapy, the drugs may be interacting or the patient may not be compliant. Persisting oral lesions require a reappraisal of the diagnosis and/or therapy and possible referral. Patients must be given careful instructions regarding the appropriate use of medications, including written instructions, if necessary. The cost of therapy should also be considered whenever a drug is prescribed.

Classification of HIV-related oral lesions

Based on the etiology, HIV-related oral lesions are grouped into four categories:

Infectious: viral, fungal and bacterial.

Inflammatory: recurrent aphthae stomatitis (RAS), lichenoid or drug reaction.

Neoplastic: Kaposi's sarcoma, non-Hodgkin's lymphoma, squamous cell carcinoma.

Miscellaneous: salivary gland diseases (xerostomia and salivary gland enlargement), nonspecific oral ulcers.



DIAGNOSIS

Establishing a definitive diagnosis of HIV-related oral lesions may be challenging, even for the experienced clinician. The most important step in a differential diagnosis is to obtain complete information from the patient regarding previous history of similar lesions, including their location, duration, conditions that seem to trigger the lesions and any history of ongoing or past therapy.

Because some of these lesions (especially ulcers) may have a similar clinical appearance, the location, duration, size and depth of the lesion can sometimes suggest the diagnosis. Ultimately, a surgical biopsy and/or a culture may be required to establish a definitive diagnosis. In the event that a biopsy cannot be performed, it may be appropriate to initiate empirical therapy and evaluate the response. However, therapy should not be initiated without a well-documented differential diagnosis.

Oral lesions in HIV-infected patients can often be a result of secondarily infected ulcers of known origin; therefore, stabilization of the oral cavity is sometimes enough to allow for the healing process to take place. For example, dry mouth and oral candidiasis infection can be contributing factors that would delay the healing of recurrent aphthous ulcers, herpetic lesions or traumatic ulcers. If an ulcer persists after two weeks of treatment with an antibacterial, antifungal or antiviral agent and the oral cavity has been stabilized, a biopsy is in order.

To facilitate the diagnosis of oral lesions associated with HIV disease, the conditions have been listed in Tables 3.1 - 3.7 and in the following discussion, based on etiology.



INFECTIOUS LESIONS

Viral

Oral viral lesions in both HIV-infected and non HIV-infected patients are largely due to viruses in the herpesvirus family, primarily **herpes simplex virus (HSV) type 1**, **Epstein-Barr virus (EBV)**, and less frequently, **cytomegalovirus (CMV)** and **varicella-zoster virus (VZV)**. Oral warts due to the **human papilloma virus (HPV)** are also common. Clinically, these lesions are not different from those described in other

medically compromised patient populations. Response to treatment and recurrence is different in the HIV/AIDS patient depending on the severity of immunosuppression.

Herpes Simplex Virus infection (HSV)

Primary HSV infection (primary herpetic gingivostomatitis) is uncommon in the HIV-infected patient, and when observed it does not appear different from the same condition in the non-HIV-infected patient. Diffuse swelling, pain, transient vesicles, erythema and ulcerations are most evident on the attached gingiva and palatal mucosa. However, lesions are often widespread and involve perioral or other oropharyngeal sites. Associated signs and symptoms include fever, malaise, cervical lymphadenopathy, sialorrhea, halitosis and dysphagia.

Recurrent HSV infection: The clinical presentation includes multiple small vesicles (2-3 mm) that ulcerate and coalesce to form larger ulcers of the oral mucosa (vermillion, gingiva, dorsal tongue, hard palate) and perioral region. Persistence of a herpetic lesion for more than one month should alert the clinician to the possibility of immune deficiency.

Primary herpetic pharyngitis: Clinically characterized by diffuse erythema and ulcerations in the soft palate, tonsillar pillar region and posterior pharynx. Pain and dysphagia are more severe than in primary HSV.

EBV-Hairy Leukoplakia

Hairy Leukoplakia is associated with HIV and may also be a marker of immunosuppression in other medically compromised HIV-negative patients as well as HIV seropositive patients. The lesion is often coinfecting with *Candida*. Clinically, Hairy Leukoplakia presents as an adherent white, shaggy or corrugated plaque, usually found bilaterally on the borders of the tongue. Hairy Leukoplakia is asymptomatic but may present a cosmetic concern. Hairy Leukoplakia has been reported in HIV-negative immunocompetent patients as well.

Cytomegalovirus (CMV)

Oral CMV may be seen in AIDS patients with advanced disease and may be a sign of systemic CMV infection (GI, retina). CMV, like other herpes-viruses, is routinely shed in saliva (approximately 60% to 90% of the population). CMV may involve any oral site and is characterized by persistent, painful ulcers, shallow to crateriform with punched-out irregular margins, covered by a pseudomembrane.

Varicella-Zoster Virus (VZV)

This opportunistic infection is a marker for HIV progression. When the skin is involved, the patient experiences pruritis, erythema and eventual crusting of ulcers with hyperpigmentation. Lesions have a distinct unilateral distribution. Complications include

postherpetic neuralgia and systemic viral dissemination. Prodromal symptoms include tingling, burning and tenderness. When the trigeminal nerve is involved, it may present as toothache, headache or radiating earache. Lesions typically stop at the midline.

Provisional Diagnosis:

A provisional diagnosis of HSV, VZV, CMV and EBV may be made based upon clinical signs and symptoms as described above.

Definitive Diagnosis:

1. Exfoliative cytology for HSV and EBV
2. Virus isolation from vesicle and/ or ulcer for HSV and CMV
3. Biopsy for immunocytochemistry, DNA in situ hybridization, electron microscopy, PCR for HSV, CMV, EBV
4. Serology acute and convalescent phase specimens required for HSV, VZV

Note: Diagnosis of oral CMV requires a biopsy that extends well into granulation tissue. Serology demonstrating a rise in IgM may be supportive of the diagnosis and may be useful to monitor response to therapy.

HPV-Oral Warts

HPV infection causes wartlike, occasionally solitary but usually multiple, finely stippled to papillary nodules with pale, rough (whitish) surfaces. Oral lesions are asymptomatic unless traumatized. The patient may or may not have skin (hand) and/or anogenital involvement. Lesions may be due to a wide range of HPV viral types. HPV lesions may be of cosmetic concern to the patient, and may be susceptible to trauma.

Clinically oral warts are very distinctive. They are usually asymptomatic, nodular or flat with a cauliflower appearance, multiple or single and frequently involve non-keratinized mucosa. Condyloma acuminatum is usually single and more nodular in appearance, seen in the floor of the mouth, labial mucosa and gingiva. Focal epithelial hyperplasia clinically presents as multiple pinkish nodules. Atypia may be observed microscopically.

Provisional Diagnosis: by clinical presentation.

Definitive Diagnosis: excisional biopsy of a representative lesion.

Fungal

Oral Candidiasis

The most commonly seen superficial fungal infection in the HIV-infected population is oral candidiasis. Oral candidiasis is caused primarily by *Candida albicans*, less often by *C. tropicalis*, *C. krusei*, *C. glabrata* and *C. parapsilosis*. Oral candidiasis is

often the first manifestation of HIV infection. However, it may also be a manifestation of other systemic conditions that are not HIV-related, such as leukemia, diabetes and antibiotic therapy. A thorough medical history is important when establishing a diagnosis and deciding whether or not to suspect HIV infection. Recurrence is more frequent as immune function deteriorates.

Clinical findings: Oral candidiasis can have several clinical presentations, but the significance of the differences is unknown. These forms are pseudomembranous, hyperplastic, erythematous (atrophic) and angular cheilitis.

Pseudomembranous: This form of candidiasis appears as slightly elevated, white or yellowish curdlike material that is easily scraped off with an instrument or swab. The patient may complain of altered taste or swelling or may be asymptomatic. The infection may appear throughout the entire oral cavity or in small areas. It will interfere with healing of any existing oral ulcer.

Hyperplastic: Firm, adherent white homogeneous lesions often found bilaterally on the tongue. The patient is usually asymptomatic. Often misdiagnosed because it resembles other white lesions such as hairy leukoplakia, frictional keratosis and lichen planus. Hyperplastic candidiasis may be more resistant to therapy than other clinical forms of candidiasis.

Erythematous: Flat red or erythematous patches anywhere on the oral mucosa but predominantly on the hard palate, attached gingiva, buccal mucosa and dorsum of tongue (atrophic). Patient may complain of swelling, burning and altered taste.

Angular cheilitis: Erythematous areas, with or without superficial erosion and crusting, or ulceration in the corners of the mouth. Intraoral colonization by *Candida* is common in patients with angular cheilitis. Therefore, intraoral treatment should be considered as well.

Provisional Diagnosis: Treatment may be initiated following a provisional diagnosis, which is based upon clinical signs and symptoms. Further diagnostic procedures are performed when response to antifungals is not achieved.

Definitive Diagnosis:

1. Response to therapy
2. Exfoliative cytology (for periodic acid–Schiff [PAS] stain)
3. Culture from saliva or scraping.
4. Biopsy for hyperplastic candidiasis if patient does not respond to antifungal therapy.

Histoplasmosis (*Histoplasma capsulatum*)

Approximately 30-50% of patients with disseminated histoplasmosis may present with oral lesions. When an oral lesion is diagnosed, the patient must be assessed for

systemic disease, particularly by liver function tests, chest x-ray and cultures of sputum, because of tropism of the fungus for these organs.

Clinical Findings: Any site of the oral mucosa can be affected. However, the gingiva is the most common site, followed by tongue, buccal mucosa and palate. The lesion usually appears as an ulcer with ill-defined margins and a granulomatous-appearing surface. Patients often have cervical and submandibular lymphadenopathy. When affecting the the gingiva, histoplasmosis can mimic severe periodontal disease.

Cryptococcosis (*Cryptococcus neoformans*)

Approximately 10% to 20% of patients with cryptococcosis develop cutaneous lesions, most commonly in the head and neck area. The oral lesion may appear as an ulcer. When an oral lesion is diagnosed, patient must be assessed for systemic disease. Cutaneous lesions resemble molluscum contagiosum, Kaposi's sarcoma or herpes simplex. Overall survival in patients with AIDS and cryptococcosis has been 5 months.

Provisional Diagnosis: deep mycoses are difficult to diagnose based on clinical presentation alone.

Definitive Diagnosis

1. Biopsy should include the ulcerated base and the margin of the lesion, with a deep wedge of tissue. The definitive diagnosis is made on tissue cultures. A fine needle aspiration biopsy (FNA) is indicated if patient presents with cervical lymphadenopathy (histoplasmosis)
2. Histoplasmin skin test: Positive for past infection but not useful for establishing the diagnosis.
3. Specimens of sputum, urine, blood and CSF should be cultured (cryptococcosis)
4. Immunodiffusion or complement fixation serologic test: 95% positive for pulmonary disease and 70% positive for disseminated disease in immunocompromised patients.

Bacterial

Tuberculosis (TB)

Tuberculosis is rarely seen in the oral cavity. When it does occur, it may present as a persistent ulcer, a firm swelling or a refractory case of periodontal disease. Rare cases of osteomyelitis have been reported. If tuberculosis is suspected, a medical evaluation is indicated.

Syphilis

The prevalence of syphilitic oral ulcers in the HIV-infected patient is not known. Clinically these ulcers can mimic aphthous stomatitis; however, there is no previous history of recurrent ulcers. Medical evaluation is indicated if syphilis is suspected.

Provisional Diagnosis: By the clinical presentation and social history of the patient such as recent STD or a previous history of TB.

Definitive Diagnosis:

1. Culture from tissue or sputum.
2. Biopsy with special stain.
3. Serology for STD
4. Skin testing for TB (not always diagnostic).
5. Chest X-ray for TB.

Inflammatory

Recurrent Aphthous Stomatitis (RAS)

Recurrent Aphthous Stomatitis is usually seen in patients with a previous history of RAS who report an increase in frequency and severity of attacks. Treatment response is similar to what is seen in non-HIV-infected patients. Recurrent Aphthous Stomatitis is a commonly seen oral ulcer in the HIV-infected patient.

Clinical Findings: The clinical presentations of RAS are the same as in a non-HIV-infected patient: minor (<5 mm), major (>5 mm), and herpetiform (>10 ulcers).

Provisional Diagnosis: Based on clinical presentation and a previous history of recurrent oral ulcers on nonkeratinized mucosa. Response to a short course of topical or systemic steroids may help in establishing the diagnosis.

Definitive Diagnosis: Biopsy is essential for persistent ulcers that are nonresponsive to treatment. It may also help to rule out viral infection or malignancy. The base of the ulcer should be included in the specimen.

Lichenoid reaction/ drug-induced ulcers

Anti cancer agents, ddC and antibiotics may cause oral ulcerations.

Provisional Diagnosis: History of sudden onset following the institution of a new drug or an increase in dose.

Definitive Diagnosis: By biopsy and recurrence of oral lesions if patient is rechallenged with suspected putative drug.

Erythema Multiforme

Erythema Multiforme in the HIV-infected patient has the same clinical presentation and course as in the non-HIV-infected patient. It is important to rule out any

underlying systemic infection that may be triggering the disease; for example, oral or systemic candidiasis, HSV, MAC or toxoplasmosis.

Clinically there is a very intense erythematous component and swelling of the oral mucosa with large shallow ulcers, covered by pseudomembrane. Some patients may develop skin lesions that are symmetrically distributed in the extremities.

Provisional Diagnosis: By clinical presentation.

Definitive Diagnosis: Based on biopsy. Tissue for biopsy should be taken from a nonulcerated area.

Neoplastic

Oral Kaposi's Sarcoma

Oral Kaposi's sarcoma may present as the first sign of AIDS or it may develop during the course of the disease. It is also found in non-HIV infected homosexual males. It remains the most common oral malignancy in HIV-infected patients although its prevalence appears to be decreasing. Kaposi's sarcoma has been associated with a sexually transmitted virus (HHV 8 or KSHV). Factors that increase the probability of Kaposi's sarcoma include low CD4 counts, homosexuality and CMV disease. In 20% to 70% of all cases, the mouth is the first site involved. It may remain the only site or may be one of multiple sites involved.

Clinically oral Kaposi's sarcoma presents as a flat, nodular or ulcerated mass, depending on the stage of tumor development. Oral Kaposi's sarcoma most often involves the palate, followed by the gingiva and dorsum of the tongue. At the early stage, oral Kaposi's sarcoma is flat, asymptomatic and almost always red or purplish in color. At a more advanced stage it becomes nodular and may or may not be symptomatic. In advanced stages, oral Kaposi's sarcoma becomes quite exophytic, ulcerated and painful, interfering with the patient's everyday life. Eventually, oral Kaposi's sarcoma may progress and destroy bone. The gingiva in patients with oral Kaposi's sarcoma will deteriorate if the patient has poor oral hygiene or periodontal disease.

Provisional Diagnosis: by clinical presentation as described above.

Definitive Diagnosis: by biopsy of tissue.

Non-Hodgkin's Lymphoma

Non-Hodgkin's lymphoma in an HIV-infected person constitutes a diagnosis of AIDS. In 4.4% of HIV-associated non-Hodgkin's lymphoma cases, the presenting lesion is seen in the mouth first. Non-Hodgkin's lymphoma is reported equally among IV drug users and homosexual males and is more common in male than in female patients. Prognosis is poor, with most patients dying within the first year after diagnosis (mean

survival 8 months). Therapy depends upon the stage of the disease and includes radiation therapy for regional disease or systemic chemotherapy for extranodal disease. The role of the dental professional is to recognize the lesion in the mouth, establish the diagnosis and refer for treatment.

Clinical Findings: Non-Hodgkin's lymphoma in the oral cavity presents as a large fungated/ulcerated, extremely painful mass. The most common sites are the palate and the gingiva. In the advanced stage there may be invasion into the maxillary sinus with morbidity and/or displacement of teeth adjacent to tumor.

Provisional Diagnosis : May be suspected from the clinical presentation.

Definitive Diagnosis: Biopsy must be done to establish the diagnosis. Non-Hodgkin's lymphoma can resemble oral Kaposi's sarcoma or persistent ulcer. The biopsy should be deep and taken from the center of the mass.

Miscellaneous Oral Lesions

HIV-associated Salivary Gland Enlargement

Enlargement of the parotid gland has been reported to be more common than enlargement of the submandibular gland. Salivary gland enlargement is usually more common in children (at least tenfold). The swelling of the salivary glands is significant from the point of view of differential diagnosis. Its etiology and pathogenesis are not clearly understood and the incidence is unknown. Diffuse infiltrative CD8+ lymphocytosis (DILS) or cystic lymphoid hyperplasia is a condition reported among HIV-infected patients. It resembles Sjögren's syndrome and is characterized by CD8-positive lymphocytosis with a diffuse lymphocytic infiltration of the salivary and lacrimal glands, gastrointestinal tract, lungs and multiple intraparotid lymphoepithelial cysts. The swelling is most often bilateral and may be soft or firm.

Provisional Diagnosis: By clinical presentation as described above.

Definitive Diagnosis:

1. For symptomatic enlargement, rule out infection. Start the patient on a one-week course of antibiotics such as penicillin or tetracycline.
2. Fine needle aspiration biopsy to rule out lymphoma, Kaposi's sarcoma, sarcoid or lymphadenitis.
3. Imaging (sonogram or MRI) may be useful to rule out multicystic lesions or a solid tumor.

Xerostomia : This symptom refers to the feeling of mouth dryness, as experienced by the patient. It is a subjective symptom, whereas the term hyposalivation refers to the measurable (objective) hypofunction of salivary glands. To assess hyposalivation, the amount of stimulated or unstimulated whole saliva per minute should be measured. Hyposalivation has been defined as less than 0.2 ml per minute of resting saliva and less than 0.5 to 0.7 ml per minute of stimulated whole saliva.

Xerostomia has been occasionally identified as a complaint of patients with HIV and AIDS. The cause is often unknown, but it may be due to a direct effect of HIV, EBV or CMV on salivary gland tissue. Drug-induced xerostomia is the most common cause of xerostomia in HIV and AIDS patients.

On palpation, the mouth mirror or the gloved finger sticks to the mucosa. The mucosa may have a pale, atrophic appearance. The dorsal surface of the tongue may show depapillation and lobulation. There may be secondary candidal involvement. Patients may complain of dryness, thick, ropy saliva and difficulty in eating and swallowing dry food. Patients may also complain of thick mucous in the oropharyngeal region.

Provisional Diagnosis: By clinical presentation as described above.

Definitive Diagnosis: Whole saliva collection (resting and/or stimulated). Whole resting saliva can be collected by asking the patient to expectorate into a calibrated glass tube over 5 minutes; the total amount is then calculated in milliliters per minute. A stimulated whole saliva specimen can be collected by having the patient chew a piece of dental wax or sugarless gum for 5 minutes and collecting the secretion in a glass tube. This may provide valuable information to the clinician regarding the type of therapy to prescribe. In dentate patients with xerostomia, caries risk must be assessed and managed.

Pain

Most patients with HIV infection experience some type of oral pain during the course of their disease. In many cases pain can be associated with an oral problem, most often due to an inflammatory process (aphthous ulcers, drug-related ulcers) or due to chronic ulcers (nonspecific, viral).

The role of the general practitioner is first to identify the source of pain and treat it. If no oral or dental problem is identified, the patient should be referred to a pain clinic or specialist or to a neurologist for further evaluation. Once the source of pain has been identified as dental, the patient can receive treatment for pain.

Many patients with HIV infection are or have been in drug rehabilitation programs, so care should be taken to ensure that whatever medication is chosen will not interfere with rehabilitation or “drug” testing. The dental clinician should contact the primary care physician if analgesics are to be prescribed.

THERAPY FOR HIV ASSOCIATED ORAL LESIONS

Infectious Lesions

Note: Based on a provisional diagnosis, prescription of antivirals may be initiated prior to the availability of laboratory test results.

Table 3.1

<i>Viral Infections</i>	
Herpes simplex	Acyclovir, 200-400 mg 5 times daily for 7-10 days; if resolution does not occur within 2 weeks, seek consultation Valaciclovir 500 mg P.O. 2 x daily (contraindicated in severely immunocompromised patients) Foscarnet, 40 mg/kg IV every 4 hours for up to 21 days (for acyclovir- resistant cases.) **Symptomatic managements: Analgesics, topical anesthetic (e.g. xylocaine, lidocaine), mucosal coating agents (e.g. milk of magnesia, kaolin-pectin)
Cytomegalo-Virus	Symptomatic management (see above **) referral for antiviral treatment: current therapy: IV Ganciclovir, Foscarnet, Cidofovir
Varicella- Zoster Virus	Refer for management zoster virus Acyclovir, 800 mg 5 times daily for 7-10 days (dermatomal zoster) Foscarnet IV for refractory cases Symptomatic management (see above**)
Epstein-Barr	Prednisone (may prevent postherpetic neuralgia)
Hairy Leukoplakia	Podophyllin resin 25%, apply to lesion once weekly if necessary Acyclovir 4 gm P.O. daily if symptomatic
Human papillomavirus	Removal of lesions by surgical excision, electrocautery or cryosurgery. Interferon-alpha (intralesional and subcutaneous) Recurrences are common.

Table 3.2

<i>Fungal Infections</i>	
Oral candidiasis	Nystatin vaginal tablets, 100,000 units. Dissolve in mouth 4 times daily for 7-14 days, after meals, or 1 or 2 tablets daily as maintenance alternatively for prevention Amphotericin sol 1 mg/ 1 mL (fungizone oral susp) Clotrimazole 10 mg 5 times daily for 7-10 days Clotrimazole 100 mg vaginal tablet dissolved in mouth 1 tablet daily or half a tablet bid. Ketoconazole 200 mg once daily for 7-14 days, or as maintenance 1 tablet three times a week. Ketoconazole cream, 2% 2 times daily. Fluconazole 100-200 mg tablets. (200 mg for 1 day, followed by 100 mg for 3-14 days, or 100 mg for 1 day, followed by 50 mg daily for 7-14 days. For maintenance 1 tablet (100-200 mg) 3 times weekly.)
For resistant Oral Candidiasis consider dose-related resistance Itraconazole 100 mg tablet; 200 mg P.O. 1 time daily for up to 14 days. or Itraconazole oral sol	
Non- <i>C. albicans</i> sp.	Consider Itraconazole
Histoplasmosis	Refer patient for therapy. Ketoconazole: 200-800 mg P.O. daily in 1 or 2 divided doses * Fluconazole: 00-400 mg daily single dose IV or P.O. ** 200-400 mg P.O. daily **** Itraconazole: 400 mg daily 200-400 P.O. bid**** Amphotericin B: 0.5-0.6 mg/kg/day IV*** 0.3-0.6 mg/kg/day IV****

(*) Nonmeningeal histoplasmosis, mucosal *Candida*, (**) mucosal candidiasis

(***) histoplasmosis, aspergillosis, (****) cryptococcosis

Oral Candidiasis

1. Topical therapy when the condition is mild and limited to the mouth.
2. Systemic therapy for severe oral candidiasis and for oropharyngeal candidiasis.
3. Maintenance (secondary prophylaxis): maintenance may be needed as the patient's HIV disease progresses. Once the acute phase of oral candidiasis has resolved, secondary prophylaxis may be considered. For maintenance, consider chronic low dose antifungal therapy.

Sucrose-sweetened topical antifungals (clotrimazole, nystatin syrup) used on a continuing basis may increase the risk of caries. In xerostomic patients, management of dry mouth should also be considered.

Deep Mycosis: Following diagnosis, referral should be made for treatment. The role of the dental practitioner, once diagnosis has been made, is to instruct the patient on regular home care to optimize oral hygiene.

Table 3.3

<i>Bacterial Infections</i>	
Tuberculosis	Refer patient for therapy
Syphilis	Refer patient for therapy

Table 3.4

<i>Inflammatory Lesions</i>	
Recurrent Aphthous Stomatitis	Improved oral hygiene Aphthasol (amlexanox 5%) Block Drug. NSAID should be added
<i>Topical steroids</i>	Fluocinonide gel 0.05%, fluocinonide ointment 0.05% in Orabase (1:1) Clobetasol ointment 0.05% in Orabase (1:1). Dexamethasone oral rinse (0.5 mg/5 ml). Hold in mouth for 3 min / spit 3-4 times daily. Intralesional steroid (triamcinolone, betamethasone) for isolated persistent aphthous lesions and for non-specific oral ulcers.
<i>Systemic steroids</i>	Prednisone 10 mg tablets, 40-60 mg orally, single dose for up to 14 days.
<i>Thalidomide</i>	100 to 200 mg once daily (available through compassionate use from pharmaceuticals suppliers via FDA authorization:Phone 301- 827-2335)
Drug-induced Oral Ulcers/ Lichenoid reaction	Rarely asked to discontinue the drug inducing the reaction (e.g., ddC). Short course of topical steroids may be helpful with referral to the primary care physician.
Erythema Multiforme	Identify any causative agent(s) drug or, refer to have the underlying condition (e.g., TB, toxoplasmosis, candidiasis) treated. If no causative factor is identified and presentation is severe, start patient on topical or systemic steroid. This form of therapy should always be discussed with patient's primary care physician. If lesions are localized and of mild presentation, topical steroids should be used as described above for RAS or used, as described above for RAS.

Table 3.5

<i>Neoplastic Lesions</i>	
Oral Kaposi's Sarcoma	
<i>Intralesional</i>	Palliative: Intralesional vinblastine .1 mg/ml (single injection or multiple injection) palliation; dose should not exceed .3 mg/cm of lesion. Sodium tetradecyl sulfate (Sotradecol) 0.3 ml/cm. (Minor side effects may occur with intralesional therapy and include self-resolving ulceration of the mucosa, discomfort or pain and transient paresthesia.) Intralesional steroid (triamcinolone, betamethasone) for isolated persistent aphthous lesions and for non-specific oral ulcers.
<i>Adjacent to gingiva</i>	Schedule for oral hygiene (root planing, scaling). Monitored for regular oral hygiene and home care.
Oral Non-Hodgkin's Lymphoma	Stabilize oral cavity. Evaluate dental status. Schedule oral hygiene and radiographic survey, prior to initiation of chemotherapy. Examine for secondary infection (bacterial, fungal, viral)

Table 3.6

<i>Miscellaneous Lesions</i>	
Salivary Gland Enlargement	Establish diagnosis and ruled out other causes of parotid gland enlargement.
Xerostomia	
<i>Topical therapies</i>	Sugar-free candy (citric acid-flavored products) and/or sugar-free chewing gum. Moisturizing or lubricating agents or saliva substitutes (methylcellulose base mucin base). Sip water throughout the day. Topical fluoride after meals and at bedtime.
<i>Systemic therapies Sialogogues*</i>	Salagen, (pilocarpine) 5 mg. Total daily dose should not exceed 30 mg, taken as 1 tablet, four times daily, one hour before meals. Pilocarpine HCl, 1 mg/ml. Prescribe as 1 to 1/2 tsp four times daily, total dose not to exceed 30 mg or as a tablet, meals, and at bedtime. Bethanechol, 25 mg tid-qid. Contraindicated for hyperthyroidism, peptic ulcer, bronchial asthma, hypertension, epilepsy, or Parkinson's disease and for patients on ganglionic blocking agents or with coronary artery disease.

* Patients with HIV-infection frequently have GI symptoms; use of sialogogues should be initiated at low dose and gradually increased depending upon effect and adverse side effect.

Table 3.7

<i>Pain Management</i>	
Mild to Moderate	Analgesic non-opioids, non-steroidal anti inflammatory (NSAIDS) drugs and opioid-like drugs. Regular schedule, with additional doses as needed. (Toxicity to the gastrointestinal mucosa is common. Potential NSAID side effects: renal dysfunction, salt and water retention, antagonism with diuretics, liver injury, granulocytopenia and hypersensitivity).
Severe Opioid analgesics	Codeine 30-60 mg oral dose in combination with acetaminophen Hydrocodone (Vicodin 5/500 or VicodinES 5 mg oral dose Oxycodone (Percodan) 4.5 mg oral dose
For terminal illness	Morphine, hydromorphone (Dilaudid) Methadone (Dolophine) Meperidine (Demorol), Adverse side effects from opioid analgesics include: Sedation, euphoria, nausea, vomiting, hypoventilation, constipation, and urinary retention. Patients with a history of pulmonary insufficiency can develop respiratory depression.

SELECTED BIBLIOGRAPHY

Oral Candidiasis:

Dios PD, Alvafez JA, Feijoo IF, Ferreiro MC. Fluconazole response patterns in HIV-infected patients with oropharyngeal candidiasis. *Oral Surg Oral Med Oral Pathol* 1995;79:170-4

Muzyka BC, Glick M. A review of oral fungal infections and appropriate therapy. *J Am Dent Assoc* 1995;126:63-72

Powderly WG, Finkelstein DM, Feinberg J, Frame P, He W, van der Horst C et al. A randomized trial comparing fluconazole with clotrimazole troches for the prevention of fungal infections in patients with advanced immunodeficiency virus infection. *N Engl J Med* 1995

Rex JH, Rinaldi MG, Pfaller MA. Resistance of candida species to fluconazole. *Antimicrob Agents Chemother* 1995; 39:1-8

Silverman S, Jr, Gallo J, McKnight M et al. Clinical characteristics and management responses in 85 HIV-infected patients with oral candidiasis. *Oral Surg Oral Med Oral Pathol Oral Radiol Oral Endod* 1996;82:402-7

Deep Mycosis:

Chinn H, Chernoff DN, Migliorati CA, Silverman S, JR, Green TL. Oral histoplasmosis in HIV-infected patients. A report of two cases. *Oral Surg Oral Med Oral Pathol* 1995; 79:710-4

Glick M, Cohen SG, Cheney RT, Crooks GW, Greenberg MS. Oral manifestations of disseminated cryptococcus in a patient with acquired immunodeficiency syndrome. *Oral Surg Oral Med Oral Pathol* 1987;64:454-9

Hicks MJ, Flaitz C, Cohen PR. Perioral and cutaneous umbilicated papular lesions in acquired immunodeficiency syndrome *Oral Surg Oral Med Oral Pathol* 1997;83:189-91

Jones AC, Migliorati CA, Baugman RA. The simultaneous occurrence of oral herpes simplex virus, cytomegalovirus, and histoplasmosis in an HIV-infected patient. *Oral Surg Oral Med Oral Pathol* 1992;74:334-9

Oda D, McDougal C, Fritsche T, Worthington P. Oral histoplasmosis as a presenting disease in acquire immunodeficiency syndrome. *Oral Surg Oral Med Oral Pathol* 1990; 70:631-6

Sharkey-Mathis PK, Velez J, Fetchik R, Graybill JR. Histoplasmosis in the acquired immune deficiency syndrome. (AIDS): treatment with fluconazole and itraconazole. J Acquir Immune Defic Syndr 1993;6:809-19

Wheat LJ. Diagnosis and management of fungal infections in AIDS. Curr Opin Infec Dis 1993;6:617-27

Recurrent Aphthous Stomatitis.

Glick M, Muzyka BC. Alternate treatment for major aphthous ulcerations in patients with AIDS. J Am Dent Assoc 1992;123:61-5

Klandwala A, Van Inwegen RG, Charney MR, Alfano MC. 5% Amlexanol oral paste, a new treatment for recurrent minor aphthous ulcers. Clinical demonstration of acceleration of healing and resolution of pain. Oral Surg Oral Med Oral Pathol 1997;83:222-30

Lozada Nur F, Miranda C, Maliksi Rocella. A double blind controlled study on the clinical efficacy of clobetasol ointment in Orabase and fluocinonide ointment in Orabase in patients with oral vesiculoerosive diseases. Oral Surg Oral Med Oral Pathol 1994;77:598-604

MacPhail LA, Greenspan D, Greenspan JS. Recurrent aphthous ulcers in association with HIV infection: diagnosis and treatment. Oral Surg Oral Med Oral Pathol 1992;73:283-8

Muzyka BC, Glick M. Major aphthous ulceration in HIV disease. Oral Surg Oral Med Oral Pathol 1994;77:116-20

Phelan JA, Eisig S, Freedman PD, Newsome N, Klein R. Major aphthous like ulcers in patients with AIDS. Oral Surg Oral Med Oral Pathol 1991;71:68-72

Porter SR, Scully C, Standen GR. Autoimmune neutropenia manifesting as recurrent oral ulcerations. Oral Surg Oral Med Oral Pathol 1994;78:178-80

Ship J. Recurrent aphthous stomatitis: An update. J Oral Surg Oral Med Oral Pathol 1996;81:141-7

Viral Diseases

Flaitz CM, Nichols CM, Hicks MJ: Herpesviridae-associated persistent mucocutaneous ulcers in acquired immunodeficiency syndrome. A clinicopathologic study. Oral Surg Oral Med Oral Pathol 1996; 81:433-41.

Glick M, Cleveland DB, Salkin LM, Alfaro-Mirando M, Fielding AF. Intraoral cytomegalovirus lesion and HIV-associated periodontitis in a patient with the acquired immunodeficiency syndrome. Oral Surg Oral Med Oral Pathol 1991;72:716-20

Gowdey G, Lee RK, Carpenter WM. Treatment of HIV-related hairy leukoplakia with podophyllum resin 25% solution. *Oral Surg Oral Med Oral Pathol* 1995; 79:64-7

Greenberg MS, Glick M, Nghiem L, Stewart LCB, Hodinka R, Dubin G. Relationship of cytomegalovirus to salivary gland dysfunction in HIV-Infected patients. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1997;83:334-9

Jones AC, Freedman PD, Phelan JA, Kerpel SM. Cytomegalovirus infection of the oral cavity *Oral Surg Oral Med Oral Pathol* 1993;75:76-85

Kost RG, Strauss SE. Post herpetic neuralgia. Pathogenesis, treatment and prevention. *N Engl J Med* 1996;335:32-41

Lozada Nur F, Podophyllum resin 25% for the treatment of oral hairy leukoplakia. A retrospective study. *Oral Surg Oral Med Oral Pathol* 1992; 73:555-58

Regezi JA, Eversole LR, Barker BF, Rick GM, Silverman S, JR. Herpes simplex and cytomegalovirus coinfecting oral ulcers in HIV-positive patients. *Oral Surg Oral Med Oral Pathol* 1996;81:55-62

Volter C, Yukai H, Delins H et al. Novel HPV types present in the oral papillomatous lesions from patients with HIV infection. *Int J. Cancer* 1996; 66:453-56

Wilcox CM, Strub RF, Schwartz DA. Cytomegalovirus esophagitis in AIDS: a prospective evaluation of clinical response to ganciclovir therapy, relapse rate, and long term outcome. *Am J Med* 1995;98:169-76.

Youle MS, Gazzard BG, Johnson MA et al. The effects of high dose oral acyclovir on herpesvirus disease and survival in patients with advanced HIV disease: a double blind placebo controlled study. *AIDS* 1994;8:641-9

Salivary Gland Disease.

Finfer MD, Schinella RA, Rothstein SG, Presky MS. Cystic parotid lesions in patients at risk for the acquired immunodeficiency syndrome. *Arch Otolaryngol Head and Neck Surg* 1988;114:1290-4

Greenberg MS, Glick M, Nghiem L, Stewart LCB, Hodinka R, Dubin G. Relationship of cytomegalovirus to salivary gland dysfunction in HIV-Infected patients. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1997;83:334-9

Schimdt M, Dodd C, Greenspan D, Daniels T, Chernoff D, Hollander H. Natural history of HIV-associated salivary gland disease 1992;74:326-31

Neoplasms:

Flaitz CM, Jin Y-T, Hicks MJ, Nichols CM, Wang Y-U, Su I-J: Kaposi's sarcoma-associated herpesvirus-like DNA sequences (KSHV/HHV-8) in oral AIDS-Kaposi's sarcoma. A PCR and clinicopathologic study. Oral Surg Oral Med Oral Pathol 1997; 83:259-64

Lozada-Nur F, de Sanz S, Silverman S, Jr, Miranda C, Regezi J. Intraoral non-Hodgkin's lymphoma in seven patients with acquired immunodeficiency syndrome. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1996;82:173-8

General:

Conte JE. Manual of antibiotics and infectious diseases. 8th ed. Williams & Wilkins; 1995

Glick M. Dental management of patients with HIV. Quintessence Publishing Co, Inc. Carol Stream, Il. 1994

Glick M, Muzyka SC, Lurie D, Salkin LM. Oral manifestations associated with HIV-related disease as markers for immunosuppression and AIDS. Oral Surg Oral Med Oral Pathol 1994; 77:344-9

Greenspan JS, Greenspan D. Oral manifestations of HIV infection. Quintessence Publishing Co, Inc. Carol Stream, Il. 1995

Silverman S Jr. Color atlas of the oral manifestations of AIDS. 2nd ed. CV Mosby, St. Louis; 1995

Chapter 4



Management and Evaluation of Occupational Exposures to Bloodborne Pathogens and Tuberculosis



Workshop Leader:

Barbara F. Gooch, D.M.D., M.P.H., Centers for Disease Control and Prevention, Atlanta, Georgia

Participants:

Helene Bednarsh, R.D.H., M.P.H., City of Boston, Department of Health, Boston, Massachusetts

Denise Cardo, M.D., Centers for Disease Control and Prevention, Atlanta, Georgia

Jennifer L. Cleveland, D.D.S., M.P.H., Centers for Disease Control and Prevention, Atlanta, Georgia

Enid A. Neidle, Ph.D., Columbia University, New York, New York

James S. Rundle, D.D.S., Indianola, Iowa

Carolyn A. Tylanda, M.S., D.M.D., Ph.D., Food and Drug Administration, Rockville, Maryland

Bryan Harvey, B.D.S., British Dental Association, London, United Kingdom

INTRODUCTION

More now than ever before, dental health care professionals (DHCPs) are concerned about managing the risks of exposures to pathogens in the workplace. This chapter describes the issues relevant to the management of occupational exposures to bloodborne pathogens, such as the human immunodeficiency virus (HIV), hepatitis B virus (HBV), and hepatitis C virus (HCV), as well as the evaluation of occupational exposures to tuberculosis (TB).

The information in this chapter does not officially represent the policies of the Public Health Service.

MANAGEMENT OF OCCUPATIONAL EXPOSURES TO BLOODBORNE PATHOGENS

Risk of Occupationally Acquired Bloodborne Infections Among Dental Workers

HIV

Available data indicate that the risk of transmission of HIV in dental settings is very low. Through December 1996, the CDC was aware of 51 health care workers in the United States who were documented as having seroconverted to HIV following a specific exposure to an HIV infected source. About 85% of the exposures which resulted in HIV seroconversion among these workers were percutaneous injuries. *None of the 51 documented seroconversions involved dental workers.* Another 111 health care workers, including 7 dental workers, were reported as possibly having acquired their infection occupationally. For each of these 7 workers, no other risk for infection, such as a behavioral or transfusion risk, could be identified during follow-up investigation. Each worker reported past percutaneous or mucous membrane exposure to blood or body fluids in the dental setting, but seroconversion resulting from a specific occupational exposure was not documented.

HIV seroprevalence studies among dentists and other dental workers, such as hygienists and assistants, indicate very low rates of HIV infection. The extent of HIV exposure (both occupationally and non-occupationally) among the dental workers tested, however, is unknown. In addition, some of these rates may be underestimated as persons who believe they are HIV-infected and who have non-occupational risks may not volunteer to be tested. Nevertheless, studies to date have not indicated a high rate of previously undetected HIV infection among the dentists sampled.

HBV

HBV seroprevalence among dentists, including oral surgeons, has decreased since the 1970s and early 1980s. In seroprevalence studies, the percentage of oral surgeons showing serological evidence of past or current HBV infection decreased from 26% in 1981 to 20% in 1992. Among general dentists, infection rates also decreased from 14% in 1972 to about 9% in 1989 and remained relatively constant through 1992. These decreased infection rates may reflect increased levels of immunity among dentists as a result of inoculation with the hepatitis B vaccine and increased adherence to universal precautions. Since a vaccine became available in 1982, reported vaccination rates have increased dramatically. By 1992, more than 85% of US dentists reported that they had received the HBV vaccine.

HCV

The hepatitis C virus is the cause of most parenterally acquired non-A, non-B hepatitis. As for HBV and HIV, HCV is transmitted by blood, sexual, or perinatal exposure. Tests for antibodies to HCV (anti-HCV) became commercially available in 1990. Seroprevalence studies among health care workers have shown rates of anti-HCV from 1% to 3%. One study of dentists in New York City showed that the anti-HCV seroprevalence among dentists, especially those who practiced oral surgery, was significantly elevated compared with blood donors. In another study, anti-HCV was found in 2.0% of oral surgeons and 0.7% of general dentists.



Risk of Infection After Contact With Infected Blood

The type of occupational blood exposure most likely to transmit bloodborne infection is a percutaneous exposure. Prospective studies of several thousand HCWs indicate that the risk of seroconversion from a single percutaneous exposure to HIV-infected blood is approximately 0.3%. The risk of seroconversion after exposure to blood from a source infected with hepatitis B depends on the e antigen (e Ag) status of the patient. If the patient's blood is positive for the e Ag (a marker of increased infectivity), the risk of transmission of HBV after a single percutaneous contact is about 30% or about 100 times that of HIV. Based on limited data, the risk of seroconversion following a percutaneous exposure to blood of a patient with HCV infection is 3% to 10% or about 10 times the risk following a single exposure to HIV-infected blood.

The risk of HIV transmission after a percutaneous exposure depends on several factors. The **viral** titer in the blood of the source patient may be the most important. This titer, however, may vary by several orders of magnitude, depending on the stage of illness of the source patient (for example, AIDS vs. asymptomatic HIV infection) and whether the source patient was taking antiviral agents to which the virus was sensitive. Laboratory studies suggest that during an exposure, less blood is transferred by needles that:

- Σ Pass through latex gloves;
- Σ Are of smaller gauges; or
- Σ Are solid rather than hollow-bore.

In a case-controlled study to evaluate risk factors for HIV transmission after percutaneous exposure to HIV-infected blood, it was observed that HCWs were more likely to become infected if they were exposed to a larger quantity of blood, represented by visible blood on the device prior to injury; if the procedure involved a needle placed directly in the patient's artery or vein, or a deep injury; and if the source patient was terminally ill with AIDS.

Transmission of HIV after mucous membrane and skin exposures has been reported from retrospective studies. Prospective studies include one seroconversion among 1,107 mucous membrane exposures (0.09%). Seroconversion after exposure to skin has not been documented from prospective studies, therefore, the risk of seroconversion following such exposure has not been quantified.

Percutaneous Exposures in Dental Settings: Risk and Prevention

Available information indicates that dentists experience percutaneous exposures at a low rate. Dentists participating in the Health Screening Program at the 1987 Annual Session of the American Dental Association reported an average rate of 11.4 injuries per year. By 1993, this rate had decreased to 2.2 injuries per year. Also since 1987, U.S. dentists have reported increasing compliance with the practice of universal precautions. In addition to appropriate use of protective barriers, such as gloves (which are not intended to prevent sharp injuries), universal precautions include care during the handling and disposal of needles and other sharp instruments.

Examination of the specific circumstances of injuries that occur in the dental office can help dental workers look for ways to avoid similar injuries in the future. Engineering controls and safer work practices are the primary measures used to prevent injuries in the dental office. Engineering controls remove the hazard from the worker. Special rigid containers for contaminated sharp instrument disposal are examples of an engineering control. Reducing the risk of exposure by changing the manner in which a task is performed is an example of a safer work practice. For example, recapping anesthetic needles on non-disposable syringes should only be done with the use of a mechanical device to hold the needle sheath or by a one-handed "scoop" technique. Because most injuries among dental workers involve the workers' hands or fingers, the continued development of personal protective equipment, such as puncture-resistant gloves, may also be important for injury prevention.

Written documentation of occupational exposures can assist dental workers in looking for ways to avoid injuries in the future. OSHA specifies that the dental employer document the exposure incident on the OSHA 200 (Log and Summary of Occupational Injuries and Illnesses) and 101 (Supplemental Record of Occupational Injuries and Illnesses) forms, if applicable.

The US Food and Drug Administration (FDA) is responsible for regulating medical products, including drugs, devices (which includes instruments), and biological products. The FDA encourages the reporting of problems or adverse events related to medical products through MEDWATCH, the FDA's medical products reporting program. Identities of both patients and reporters (if requested) are kept confidential. For further information call 1-800-FDA-1088.

Since 1983, health care workers exposed to HIV-infected blood have been voluntarily enrolled in a national surveillance project conducted by CDC. This prospective surveillance project is commonly known as the "CDC Needlestick Study."

Health care workers who sustain a percutaneous, mucous membrane, or non-intact skin exposure to HIV-infected blood are eligible to participate in the project. Additional information about the surveillance project can be obtained from the Hospital Infections Program, National Center for Infectious Diseases, CDC, Mail Stop E68, Atlanta, GA 30333; phone (404) 639-6425.

HIV Postexposure Prophylaxis

Although preventing blood exposures is the primary means of preventing occupationally acquired HIV infection, appropriate postexposure management is an important element of workplace safety. Information suggesting that zidovudine (ZDV) postexposure prophylaxis (PEP) may reduce the risk of HIV transmission after occupational exposure to HIV-infected blood prompted the Public Health Service to update a previous statement on management of occupational exposure to HIV and recommend postexposure chemoprophylaxis after certain exposures to HIV. Because of the low rate of seroconversion following an occupational exposure to HIV-infected blood, a large sample of the health care workers would be necessary for a trial to have statistical power to assess the efficacy of PEP. The only control trial to evaluate efficacy of ZDV failed to enroll enough participants. In a case-control study among health care workers, ZDV PEP was associated with a decrease of approximately 79% in the risk of HIV seroconversion after percutaneous exposure to HIV-infected blood. Other studies have noted a similar protective effect of ZDV prophylaxis. For example, following ZDV administration to HIV-infected pregnant women and their infants, a 67% reduction in perinatal HIV transmission was observed. ZDV prophylaxis of the fetus and/or infant may have contributed to these results, as this protective effect of ZDV in this prospective trial was only partly explained by reduction of the HIV titer in maternal blood. PEP also prevented or ameliorated retroviral infection in some studies in animals.

Chemoprophylaxis is recommended for workers after certain occupational exposures to HIV. Because most occupational exposures to HIV do not result in immediate infection transmission, potential toxicity of PEP must be carefully considered when prescribing PEP. PEP should be recommended to health care workers who have sustained occupational HIV exposures which pose a risk for transmission. For exposures with negligible risk, PEP is not justified. Agents used for PEP should be active against HIV and have low toxicity when used for short term therapy. The majority of HIV exposures will warrant only two-drug regimens, using two nucleoside analogues, usually ZDV and 3TC. The addition of a third drug, usually a protease inhibitor is recommended only for exposures which pose the highest or increased risk for transmission, or for exposures in which the virus is known or suspected to be broadly resistant. In the PHS provisional recommendations, Indinavir or Nelfinavir are protease inhibitors recommended. These recommendations should be implemented in consultation with persons having expertise in antiretroviral therapy and HIV transmission.

If used, PEP should be started promptly, preferably within a few hours post-exposure. Although animal studies suggest that PEP is unlikely to be effective when started later than 24-36 hours post-exposure, there are no data in humans to define an

interval after which the benefit of PEP is lost. Starting therapy after a long interval (e.g., 1-2 weeks) may be considered for the highest risk exposures; even if infection is not prevented, early treatment of acute HIV infection may be beneficial. The optimal duration of PEP is unknown; since 3-4 weeks of ZDV appeared protective, PEP should be given for 4 weeks if tolerated.

If the source patient or the patient's HIV status is unknown, decisions regarding initiation of PEP should be individualized, based on the likelihood of HIV infection in known or possible source patients. If additional information becomes available, decisions regarding PEP can be modified.

Health care workers with occupational exposures to HIV should have medical follow-up evaluation, including HIV antibody tests at baseline, 6 weeks, 12 weeks, and 6 months post-exposure, and should observe precautions to prevent possible secondary transmission. If PEP is used, drug toxicity monitoring should include a complete blood count and renal and liver chemical function tests at baseline and 2 and 4 weeks after starting PEP. If toxicity is noted, dose reduction should be considered and further studies may be indicated.

Prospective studies have been performed to evaluate toxicity associated with zidovudine use in health care workers after an exposure to HIV-infected blood. Symptoms such as nausea, vomiting, headache, and malaise have been reported frequently. In approximately 30 % of the cases workers did not complete the planned course of ZDV due to these adverse symptoms.

The toxicity of other antiretroviral drugs in persons infected with HIV has been well characterized. In HIV-infected adults, 3TC can cause gastrointestinal symptoms and, rarely, pancreatitis. Indinavir toxicity includes mild hyperbilirubinemia and kidney stones; the latter can be limited by drinking at least 1.5 liters (48 ounces) of fluid per 24 hour period. Based on limited data, ZDV use in the second and third trimesters of pregnancy and early infancy was not associated with serious adverse effects in mothers or infants; however, few data are available on the safety of ZDV in the first trimester of pregnancy or of other antiretroviral agents during pregnancy. Few data exist to assess possible long term (delayed) toxicity of antiretroviral agents in uninfected persons.

Failure of postexposure zidovudine to prevent HIV infection in health care workers after percutaneous exposure to HIV-infected blood has been reported in 13 instances. Five additional cases of zidovudine failure have been reported after exposures in which the quantity of HIV-infected blood was larger than would be expected from a needlestick. These case reports indicate that if zidovudine is protective, any protection afforded is not absolute.

Clinicians who need assistance in managing occupational exposures should access local experts in HIV treatment as much as possible. In addition, the "National Clinicians' Post-Exposure Prophylaxis Hotline (PEP-Line)" has been created to assist clinicians with these issues; telephone (888) 448-4911.

Consideration of Post-Exposure Management Issues in Dental Settings (Tables 1 and 2)

Policy Statement

Each dental setting including training programs (schools, not private offices) must have a policy (written exposure plan) in place for managing percutaneous injuries and mucous membrane and non-intact skin exposure to blood. This policy must be consistent with the practices and procedures for worker protection required by the Occupational Safety and Health Administration (OSHA) final rule on Occupational Exposure to Bloodborne Pathogens (29 CFR 1910.1030) and current PHS recommendations for management of occupational exposures to HBV and HIV (Tables 1 and 2).

Education and Training

Persons such as dental workers and students who might reasonably be considered at risk of occupational exposure to blood or other potentially infectious fluids in dental settings should be taught principles of postexposure management as part of job orientation and ongoing job training.

Persons at risk of occupational exposure to blood should be educated to report exposures immediately after they occur. Time is critical as certain interventions, such as prophylaxis against HBV (administration of HBV vaccine, HBV immune globulin [HBIG], or both) must be initiated promptly to be effective. Workers should be informed that PEP is recommended for some occupational exposures to HIV and that if used, PEP should be started promptly, preferably within 1 hour post-exposure.

Identification of a Health Care Professional (HCP)

OSHA specifies that a "licensed health care professional" is a person whose legally permitted scope of practice allows him or her to independently perform the activities required. Identification of a designated HCP is summarized in the following statement:

The dental office should select a HCP or HCPs who are capable of managing an occupational exposure incident and performing appropriate counseling, as well as all necessary medical follow-up and referral, in accordance with current PHS recommendations. The HCP should be selected *before* workers and students or others are placed at risk of occupational exposure to blood.

Specific Management Considerations

First aid should be administered as necessary. There are no data to suggest that specific first aid measures decrease the risk of transmission of bloodborne pathogens

following exposure. Extraordinary measures--such as soaking injured tissues with bleaches, excessive scrubbing, or anything that challenges the integrity of the skin--have not been shown to prevent transmission of bloodborne pathogens, post-exposure. General first aid instructions follow.

- Σ Puncture wounds and other injuries to the skin should be washed with soap and water. An antiseptic agent may be applied.
- Σ Exposed oral and nasal mucosa should be decontaminated by flushing with water.
- Σ Eyes should be irrigated with clean water, saline, or sterile irritants designated for this purpose.

Chemotherapeutic Agents (Use and Timing)

In advance of an exposure incident, workers should be informed that knowledge regarding efficacy and toxicity of PEP is limited; for agents other than ZDV, there are few data on toxicity in persons without HIV infection or who are pregnant; and they have the option to decline any or all drugs for PEP. Education about considerations for use of an antiviral agent should be coordinated with the designated HCP and may be incorporated into ongoing training required by the OSHA standard.

Initial Reporting Process

OSHA specifies that employees should be instructed to immediately report exposure incidents to their employer. In each dental setting, therefore, there should be a person or persons designated to whom incidents should be immediately reported who will:

- Σ Determine if the injury resulted in exposure to blood or other potentially infectious fluids.
- Σ Initiate referral to the designated HCP when indicated.
- Σ Complete necessary report forms (for example, OSHA 200: Log and Summary of Occupational Injuries and Illnesses).

The designated person in the dental setting should ensure that information required by OSHA and information about other significant aspects of the exposure are provided to the designated HCP. OSHA specifies that the dental employer must provide the designated HCP with: a copy of the bloodborne pathogens standard, a description of the employee's job duties as they relate to the incident, a report of the specific exposure incident including routes of exposure and the testing, if available, and relevant employee medical records (including vaccination status) which the employer must maintain. Aspects of the exposure that would be provided to the designated person may include:

- Σ Specific type of instrument involved.
- Σ Gauge of the needle, when applicable.
- Σ Presence of blood on the instrument.
- Σ Depth of the wound.

- Σ Bleeding at wound site.
- Σ HIV, HBV, and HCV status of source patient, if known.
- Σ Stage of disease and use of anti-retroviral therapy by HIV-infected source patients.
- Σ An estimate of the number of patients at risk for HIV or HBV infection in the practice if HIV/HBV status of source patient is unknown.

A person in the dental office should be designated to discuss the incident with the source patient, if necessary, and initiate referral for medical evaluation and testing of the source patient, as indicated. Preferably, this person should not be the injured worker or student. OSHA specifies that the dental employer must identify and document in writing the source individual in an exposure incident, unless this is not feasible or prohibited by state or local law. The dental employer should contact the source patient, if known, and ask his or her consent to be tested for HBV and HIV infectivity and to disclose the test results to the exposed employee.

Counseling

Counseling is an essential part of the follow-up process. After an occupational exposure to blood, a worker may experience a range of psychological reactions including anger, denial, fear, anxiety, sadness, depression, and sleep disturbance. The designated HCP should be able to provide necessary and appropriate counseling addressing, at a minimum, on the following topics.

- Σ Estimates of risk for infection based on the type of exposure (for example, mucosal vs. percutaneous) sustained.
- Σ Considerations for antiretroviral chemoprophylaxis for exposure to HIV.
- Σ The plan for, components of, and timing of, follow-up testing and counseling.
- Σ Precautions that may be useful to avoid transmission to others during the follow-up period, especially the first 6-12 weeks after the exposure when most infected persons are expected to seroconvert.
- Σ Ongoing emotional support for the injured person.
- Σ Any questions related to the exposure posed by the injured person.

Legal Issues, Ethical Considerations and Confidentiality

- Σ All aspects of postexposure management should be carried out in accordance with federal, state and local laws.
- Σ The circumstances surrounding the incident, the persons involved, and any other information or documentation pertaining to the incident should be treated in a confidential manner.
- Σ The injured person should be careful about sharing this information with others.
- Σ Dental staff should understand that the source individual may object to medical referral and potential testing.
- Σ Staff should maintain the confidentiality of the source individual.

PHS Recommendations for Management of Exposure to Blood

Once an exposure to blood has occurred, the blood of the individual from whom exposure occurred (source patient) should be tested for HBV surface antigen (HBsAg) and antibodies to HIV and HCV. Local laws regarding consent for testing source individuals must be followed. Testing of the source individual should be done at a location where appropriate counseling is available. Post-test counseling and referral for treatment should be provided.

HCV

Currently, the PHS recommends that individual health-care institutions consider implementing policies and procedures to follow-up for HCV infection after percutaneous or permucosal exposures to blood. Such policies should include:

- Σ the source, baseline testing for antibodies to HCV (anti-HCV)
- Σ the person exposed to an anti-HCV-positive source, baseline and follow-up (e.g. 6-month) testing for anti-HCV and liver enzyme activity;
- Σ education for HCWs about the risk for and prevention of bloodborne infections, including hepatitis C, in occupational settings, with information routinely updated to ensure accuracy.

To date, intramuscular immune globulin (IG) has been offered to health care workers after an exposure to HCV-infected blood as a prophylactic measure. Recent animal studies, however, indicate that IG does not protect against infection with HCV. Also, IG is now manufactured from plasma which is screened for anti-HCV. Thus, available data do not support the use of IG for postexposure prophylaxis of HCV.



Post-Exposure OSHA Requirements for Evaluation and Follow Up (Table 2)

OSHA, in cooperation with the American Dental Association, has developed a guidance document to help dental employers better understand their obligations under the standard. This document was published in February 1995 and does not reflect changes in PHS guidelines for postexposure chemoprophylaxis for HIV. **Please refer to previous sections for information regarding recommendations for HIV PEP.**

Evaluation of Occupational Exposures to TB

The oral conditions that cause patients with TB to seek treatment from a dentist are rarely the result of infectious TB. Therefore, unless a dental patient is coincidentally infectious for TB, the risk of exposure to infectious TB is probably low. Furthermore, the generation of droplet nuclei containing *M. tuberculosis* during dental procedures has not been demonstrated.

Available data assessing the risk of occupationally acquired TB among dental workers also does not suggest a significant risk of transmission in dental settings. In 1981, a dentist with untreated active TB reportedly transmitted TB to 15 pediatric patients by direct inoculation of extraction sites or by expelled infectious droplet nuclei. Possible transmission of multi-drug-resistant tuberculosis (MDR-TB) between two dental workers has been reported, however, a dental patient with the same strain of TB could not be identified as the source of the dental workers' TB infection. A recent 1993 survey showed a prevalence of reactive tuberculin skin tests among Indian Health Service and Bureau of Prison dentists treating patients at risk for TB that is consistent with the estimated prevalence of TB in the general population.

TB transmission is most likely to occur from patients with unrecognized and untreated pulmonary or laryngeal TB who have not been placed in TB isolation. As a result, some dental patients and workers may be at risk for TB. Because the potential for transmission in dental settings exists, the strategies detailed in the following section should be adopted by all dental offices.

Strategies for Primary Prevention are Recommended

- **Conduct an Assessment of Risk for TB Transmission in Each Dental Setting Periodically.** TB infection control policies for each dental setting should be based on risk assessment.
- **Train Dental Workers to Recognize and Refer Patients With Signs and Symptoms Suggestive of TB.** Patients with a productive and prolonged cough, fever, fatigue, or anorexia should be referred to a physician for medical evaluation.
- **Update Patient's Medical History About TB at Every Dental Appointment and Document in Chart.**
- **Defer Elective Dental Treatment for Patients Known or Suspected to Have Active TB Until Effectively Treated and No Longer Infectious.** Acid fast bacillus (AFB) isolation precautions should be followed and particulate respirators worn if emergency treatment is required.
- **Develop Employer-Sponsored Education, Counseling, and Screening Programs for Dental Workers.**

Evaluation of Dental Workers and Patients After Unprotected Exposure to TB

On occasion, dental offices may receive notification of infected patients or employees from local health departments during contact investigations, from the referring physician, or from the infected patient or worker. Whatever the case, if it is discovered that a patient with active TB has been treated in the dental office without appropriate precautions or if a dental worker develops active TB and exposes other persons in the office, the following steps should be taken.



Centers for Disease Control and Prevention (CDC) Recommendations

- **Unless a negative skin test has been documented within the preceding 3 months, each exposed person, except those already known to be positive reactors, should receive a tuberculin skin test as soon as possible after exposure.** Baseline testing of dental personnel is advisable so that if an unexpected exposure occurs, conversions can be distinguished from positive skin tests that are the result of previous exposures.
- **If the initial skin test is negative, the test should be repeated 12 weeks after the exposure ended**
- **Those persons testing positive should be evaluated by a physician for active disease or preventive treatment.**
- **Personnel diagnosed with active tuberculosis should be offered counseling and hiv-antibody testing.**
- **An investigation of the exposure incident should be conducted by the dentist or appropriately trained public health department personnel to identify infection control procedures which may have prevented the exposure.**

Conclusion

The dental health care professional has multiple considerations when assessing exposure issues related to TB. Preventing transmission should be forefront in the practitioner's mind. If dental health care professionals or patients are exposed to TB, the recommendations of the CDC should be followed closely.

This chapter describes the many considerations for managing occupational exposure to bloodborne pathogens and evaluating exposures to TB. Dental health care professionals are encouraged to seek additional information on these issues through further readings from the bibliography or by contacting their local or state dental societies or the CDC.

SELECTED BIBLIOGRAPHY

Bloodborne Pathogens

Alter MJ. The detection, transmission, and outcome of hepatitis C virus infection. *Infectious Agents and Disease* 1993;2:155-166.

Beekman SE, Henderson DK. Managing occupational risks in the dental office: HIV and the dental professional. *JADA* 1994;125:847-52.

Bell DM, Curran JW. Human immunodeficiency virus infection. In: Bennett JV, Brachman PS, eds. *Hospital Infections*, 3rd ed. Boston: Little, Brown, and Co, pp 823-48.

Bell DM, Gerberding JL. Human immunodeficiency virus (HIV) postexposure management of healthcare workers. *Am J Med* 1997;102 (5B):1-126

Centers for Disease Control and Prevention. Public Health Service statement on management of occupational exposure to human immunodeficiency virus, including considerations regarding zidovudine postexposure use. *MMWR* 1990;39(No. RR-1).

Centers for Disease Control and Prevention. Hepatitis B virus: a comprehensive strategy for eliminating transmission in the United States through universal childhood vaccination. *MMWR* 1991;40.

Centers for Disease Control and Prevention. HIV/AIDS surveillance report. 1996;8:21.

Centers for Disease Control and Prevention. Update: Provisional Public Health Service recommendations for chemoprophylaxis after exposure to HIV. *MMWR* 1996;45:468-72.

Centers for Disease Control and Prevention. Recommendations for follow-up of health-care workers after occupational exposure to hepatitis C virus. *MMWR* 1997;46:603-6.

Center for Disease Control and Prevention. Public Health Service Guidelines for the Management of Health-Care Worker Exposure to HIV and Recommendations for Postexposure Prophylaxis. *MMWR* 1998;47:1-33

Cleveland JL, Lockwood SA, Gooch BF, et al. Percutaneous injuries during dental procedures: an observational study. *JADA* 1995;126:745-51.

Cleveland JL, Siew C, Lockwood SA, Gruninger SE, Gooch BF, Shapiro CN. Hepatitis B vaccination and infection among US dentists, 1983-1993. *JADA* 1996;127:1385-92.

Cleveland JL, Gooch BF, Lockwood SA. Occupational blood exposures in dentistry: a decade in review³. *Infect Control Hosp Epidemiol*. (October, 1997; in press).

Department of Labor, Occupational Safety and Health Administration. 29 CFR Part 1910.1030, occupational exposure to bloodborne pathogens; final rule. Federal Register 565(235):64004-182, 1991.

Fahey BJ, Beekman SE, Schmitt JM, et al. Managing occupational exposure to HIV-1 in the healthcare workplace. *Infect Control Hosp Epidemiol* 1993;14:405-12.

Fazely F, Haseltine WA, Rodger RF, et al. Postexposure chemoprophylaxis with ZDV or ZDV combined with interferon: failure after inoculating rhesus monkeys with a high dose of SIV. *J Acquir Immune Defic Syndr* 1991;4:1093-7.

Gaughwin MD, Gowans E, Ali R, et al. Blood needles: the volumes of blood transferred in simulations of needlestick injuries and shared use of syringes for injection of intravenous drugs. *Aids* 1991;5:1025-7.

Gerberding JL. Is antiretroviral treatment after percutaneous HIV exposure justified? (editorial). *Ann of Int Med* 1993;118:979-80.

Gerberding JL and Henderson DK. Management of occupational exposure to bloodborne pathogens: hepatitis B virus, hepatitis C virus, and human immunodeficiency virus. *Clin Infect Dis* 1992;14:1179-85.

Gruninger SE, Siew C, Chang S-B, et al. Hepatitis B, C and HIV infection among dentists (Abstract 2131). *J Dent Res* 1991;70:532.

Gruninger SE, Siew C, Chang S-B, et al. Human immunodeficiency virus type 1 infection among dentists. *JADA* 1992; 123(3): 57-64.

Henderson DK, Beekman SE. Management of occupational exposures to bloodborne pathogens. In: Glick M, ed. *Dental Management of Patients with HIV*. Carol Stream, IL: Quintessence, 1994:275-87.

Henderson DK, Fahey BJ, Willy M, et al. Risk for occupational transmission of human immunodeficiency virus type 1 (HIV-1) associated with clinical exposure. A prospective evaluation. *Ann Intern Med* 1990;113:740-6.

Ho D, Moudgil T, Alam M. Quantitation of human immunodeficiency virus type I in the blood of infected persons. *N Engl J Med* 1988;391:284.

Ippolito G, Puro V, DeCarli G. The risk of occupational human immunodeficiency virus infection in health care workers. Italian multicenter study. *Arch Intern Med* 1993;153:1451-8.

Kiyosawa K, Sodeyama T, Tanaka E, et al. Hepatitis C in hospital employees with needlestick injuries. *Ann Intern Med* 1991;115:367-9.

- Klein RS, Freeman K, Taylor PE, Stevens C. Occupational risk for hepatitis C virus infection among New York City Dentists. *Lancet* 1991;338:1539-42.
- Marcus R. CDC Cooperative Needlestick Study Group. Surveillance of health-care workers exposed to blood from patients infected with the human immunodeficiency virus. *N Engl J Med* 1988;319:1118-23.
- Mitsui T, Iwano K, Masuko K, et al. Hepatitis C virus infection in medical personnel after needlestick accident. *Hepatology* 1992;16:1109-14.
- Moseley JW, Edwards VM, Casey G, et al. Hepatitis B virus infection in dentists. *N Engl J Med* 1975; 293:729-34.
- Puro P, Ippolito G, Guzzanti E, et al. Zidovudine prophylaxis after accidental exposure to HIV: the Italian experience. *AIDS* 1992;6:963-9.
- Ramos-Gomez F, Ellison J, Greenspan D, Bird W, Lowe S, Gerberding JL. Accidental exposures to blood and body fluids among health care workers in dental teaching clinics: a prospective study. *JADA* 1997;128:1253-61
- Reingold AL, Kane MA, Hightower AW. Failure of gloves and other protective devices to prevent transmission of hepatitis B virus to oral surgeons. *JAMA* 1988;259:2558-60.
- Ruprecht RM, O'Brien LG, Rossoni LD, et al. Suppression of mouse viraemia and retroviral disease by 3'-azido-3'-deoxythymidine. *Nature* 1986;323:467-9 .
- Shih C-C, Kaneshima H, Rabin L, et al. Postexposure prophylaxis with zidovudine suppresses human immunodeficiency virus type I infection in SCID- hu mice in a time-dependent manner. *J Infect Dis* 163:625-627; 1991.
- Shirazian D, Herzlich BC, Mokhtarian F, et al. Needlestick injury: blood, mononuclear cells, and acquired immunodeficiency syndrome. *Am J Infect Control* 1992;20:133-7.
- Short LJ, Bell DM. Risk of occupational infection with blood-borne pathogens in operating and delivery room settings. *Am J Infect Control* 1993;21:343-50.
- Siew C, Chang S-B, Gruninger SE, et al. Self-reported percutaneous injuries in dentists: implications for HBV, HIV transmission risk. *JADA* 1992;123:37-44.
- Siew C, Gruninger SE, Change S-B, et al. Seroprevalence of hepatitis B and HIV infection among oral surgeons (Abstract 1431). *J Dent Res* 1994; 73:281.
- Siew C, Gruninger SE, Mitchell EW, et al. Survey of hepatitis B exposure and vaccination in volunteer dentists. *JADA* 1987;114:457-9.

Tavares L, Roneker C, Johnston D, et al. 3'-Azido-3'-deoxythymidine in feline leukemia virus-infected cats: a model for therapy and prophylaxis of AIDS. *Cancer Res* 1987;47:3190-4.

Thomas DL, Gruninger SE, Siew C, Joy ED, Quinn TC. Occupational risk of hepatitis C infections among general dentists and oral surgeons in North America. *Am J Med* 1996;100:41-45

Tokars JJ, Marcus R, Culver DH, et al. Surveillance of HIV infection and zidovudine use among health care workers after occupational exposure to HIV-infected blood. *Ann Intern Med* 1993;118:913-9.

US Department of Health and Human Services. Dental Infection Control File: Practical Infection Control in the Dental Office. Atlanta/Rockville, Md: CDC/FDA, 1993. #PB-94113990

Shih C-C, Kaneshima H, Rabin L, et al. Postexposure prophylaxis with zidovudine suppresses human immunodeficiency virus type I infection in SCID-hu mice in a time-dependent manner. *J Infect Dis* 163:625-627; 1991.

Shirazian D, Herzlich BC, Mokhtarian F, et al. Needlestick injury: blood, mononuclear cells, and acquired immunodeficiency syndrome. *Am J Infect Control* 1992;20:133-7.

Short LJ, Bell DM. Risk of occupational infection with blood-borne pathogens in operating and delivery room settings. *Am J Infect Control* 1993;21:343-50.

Siew C, Chang S-B, Gruninger SE, et al. Self-reported percutaneous injuries in dentists: implications for HBV, HIV transmission risk. *JADA* 1992;123:37-44.

Siew C, Gruninger SE, Chang S-B, et al. Seroprevalence of hepatitis B and HIV infection among oral surgeons (Abstract 1431). *J Dent Res* 1994; 73:281.

Siew C, Gruninger SE, Mitchell EW, et al. Survey of hepatitis B exposure and vaccination in volunteer dentists. *JADA* 1987;114:457-9.

Tavares L, Roneker C, Johnston D, et al. 3'-Azido-3'-deoxythymidine in feline leukemia virus-infected cats: a model for therapy and prophylaxis of AIDS. *Cancer Res* 1987;47:3190-4.

Thomas DL, Gruninger SE, Siew C, Joy ED, Quinn TC. Occupational risk of hepatitis C infections among general dentists and oral surgeons in North America. *Am J Med* 1996;100:41-45

Tokars JJ, Marcus R, Culver DH, et al. Surveillance of HIV infection and zidovudine use among health care workers after occupational exposure to HIV-infected blood. *Ann Intern Med* 1993;118:913-9.

US Department of Health and Human Services. Dental Infection Control File: Practical Infection Control in the Dental Office. Atlanta/Rockville, Md: CDC/FDA, 1993. #PB-94113990

Woolwine J, Mast S, Gerberding JL. Factors influencing needlestick infectivity and decontamination efficacy: an ex vivo model (Abstract 1188). Thirty-second interscience conference on antimicrobial agents and chemotherapy, Anaheim. Washington, DC: American Society for Microbiology, 1992.

Tuberculosis

Centers for Disease Control and Prevention. Guidelines for preventing the transmission of *Mycobacterium tuberculosis* in health-care settings, 1994. MMWR 1994; RR-13.

Centers for Disease Control and Prevention. Self-reported tuberculin skin testing among IHS and BOP dentists. MMWR 1994;43:209-11.

Cleveland J, Gooch B, Bolyard E, Simone P, Mullan R, Marianos D. TB infection control recommendations from the CDC, 1994: Considerations for dentistry. JADA 1995;126:593-600

Cleveland JL, Kent J, Gooch BF, et al. Multi-drug resistant *Mycobacterium tuberculosis* in an HIV dental clinic. Infect Control Hosp Epidemiol 1995;16:7-11

Roderick Smith WH, Davis D, Mason KD, Onions JP, et al. Intraoral and pulmonary tuberculosis following dental treatment. Lancet 1982;1:842-4.

Post-Exposure Evaluation and Follow-Up Requirements under OSHA's Standard for Occupational Exposure to Bloodborne Pathogens

A GUIDE TO DENTAL EMPLOYER OBLIGATIONS

*Prepared by the American Dental Association in
cooperation with the Occupational Safety and Health
Administration U.S. Department of Labor
December 1997*

Post-Exposure Evaluation and Follow-Up Requirements under OSHA's Standard for Occupational Exposure to Bloodborne Pathogens

A Guide to Dental Employer Obligations

OVERVIEW

OSHA's final rule for *Occupational Exposure to Bloodborne Pathogens* [29 CFR 1910.1030(f)] requires the dental employer to make immediately available confidential medical evaluation and follow-up to an employee reporting an exposure incident.

An exposure incident is any eye, mouth, mucous membrane, non-intact skin, or other parenteral contact with blood or other potentially infectious material (OPIM). (For example, a puncture from a contaminated sharp such as an injection needle or a cut from a scalpel blade or suture needle.) Saliva in dental procedures is treated as OPIM.

The dental employer must refer the exposed employee to a licensed health care professional. This means a person who is licensed under the laws of the state where he/she practices to independently provide the post-exposure evaluation and follow-up services required by the standard. The health care professional will counsel the individual about what happened and how to prevent further spread of any potential infection. He or she will prescribe appropriate follow-up in accordance with current U.S. Public Health Service recommendations. The licensed health care professional also will evaluate any reported illness to determine if the symptoms may be related to Human Immunodeficiency Virus (HIV) or Hepatitis B Virus (HBV) infection.

Note: The standard is designed to

prevent occupational exposure to blood or OPIM. If the required controls are in place and the standard is correctly implemented, then exposure incidents will be relatively uncommon events.

STEP-BY-STEP GUIDE TO COMPLIANCE.

Note: This section is designed to supplement the attached flow chart outlining the standard's requirements following an exposure incident.

Reporting Incident —

Employees should **immediately** report exposure incidents to the employer to permit timely medical follow-up. According to the U.S. Public Health Service, if HIV postexposure prophylaxis is medically indicated it should be initiated promptly, preferably within 1-2 hours after the exposure incident. Immediate reporting also enables the dental employer to evaluate the circumstances surrounding the exposure incident to try to find ways to prevent such a situation from occurring again.

Referral to a Health Care Professional (HCP) —

Following a report of an exposure incident, the dental employer shall make **immediately** available to the exposed employee a confidential medical evaluation and follow-up at no cost to the employee. The dental employer is responsible for providing follow-up, but is not required to perform the follow-up. The employer must refer the exposed employee to a licensed health care professional who will perform all medical evaluations and procedures

in accordance with the most current recommendations of the U.S. Public Health Service.

Note: The bloodborne pathogens standard is a performance oriented standard. As such, it requires that medical evaluation and follow-up be provided in accordance with the U.S. Public Health Service recommendations, but does not cite specific recommendations. OSHA intentionally drafted the standard in this fashion to ensure that the most current recommendations would be followed.

Documentation — The dental employer must prepare a report of the exposure incident, including the route(s) of exposure, the circumstances under which the exposure incident occurred, and the identity of the source patient—if known, and if permitted by law (see *Identification and Testing of Source Patient's Blood* on page 3). This report must be placed in the employee's confidential medical record. A copy also must be provided to the evaluating health care professional.

Note: Additionally, an exposure incident **may** meet the criteria for OSHA's Recordkeeping Requirements as a "recordable occupational injury". These requirements apply to dental employers with eleven or more employees and require the completion of OSHA forms 200 (*Log and Summary of Occupational Injuries and Illnesses*) and 101 (*Supplemental Record of Occupational Injuries and Illnesses*). The criteria for recording under such circumstances include the following:

1. The incident results in a loss of consciousness, transfer to another job, or a work restriction, or

2. The incident results in the administration or recommendation of medical treatment beyond first aid (e.g., gamma globulin, hepatitis B immune globulin, hepatitis B vaccine, zidovudine or other prescription medications), or

3. The incident results in a diagnosis of seroconversion.

Dental employers with fewer than eleven employees must prepare a report of the exposure incident, but they are not required to complete the OSHA forms 101 and 200.

Information Provided to the HCP — The dental employer must provide the licensed health care professional with a copy of the bloodborne pathogens standard; a description of the employee's job duties as they relate to the incident; a report of the specific exposure incident, including routes of exposure and the circumstances under which exposure occurred; the results of the source patient's blood testing, if available; and relevant employee medical records, including vaccination status, which are the employer's responsibility to maintain. Multiple copies of the standard need not be given to the same health care professional (e.g., if a copy was provided to the health care professional in connection with an earlier exposure incident).

Identification and Testing of Source Patient's Blood — The employer must identify and document in writing the source patient in an exposure incident, unless this is not feasible or is prohibited by state or local law. The dental employer must contact the source patient, if known, and ask his or her consent to be tested for HBV and HIV infectivity and to disclose the test results to the exposed employee.

If consent is **not** obtained, and is required by local law, the dental employer must document that fact in writing as part of the report of the exposure incident. If consent is obtained, or if it is not legally required and the source patient's blood is available, the source patient's blood must be tested as soon as feasible. The results of the testing must be made available to the exposed employee and he or she must be informed of applicable laws and regulations concerning further disclosure of the identity and infectious status of the source patient.

Note: For those jurisdictions that do not require consent of the patient, the source patient's blood, if available, must be tested. The term "if available" applies to blood samples that have already been drawn from the source patient. OSHA does not require re-drawing of blood for HBV and HIV testing without consent of the source patient.

Collection and Testing of Employee's Blood — This section and the following three sections on *Counseling*, *Post-Exposure Prophylaxis*, and *Evaluation of Reported Illnesses* deal with the medical services that must be provided free of charge to an employee who has an exposure incident. The dental employer is required to arrange with a licensed health care professional to provide these services.

If the employee consents, the health care professional will, as soon as feasible, collect the exposed employee's blood and conduct baseline testing to establish the employee's HBV and HIV serological status. Baseline testing allows the health care profes-

sional to determine whether any subsequently diagnosed disease was acquired as a result of the exposure incident.

The employee has the right to decline testing or to delay testing of the collected blood for up to 90 days. If the employee consents to baseline blood collection, but does not give consent for HIV testing at that time, the sample must be preserved for at least 90 days. If, within 90 days of the exposure incident, the employee elects to have the baseline sample tested, such testing shall be done by the health care professional as soon as feasible.

The health care professional will notify the employee of all test results. All laboratory tests must be performed by an accredited laboratory at no cost to the employee.

Counseling — Counseling is a vital component of the required post-exposure follow-up procedures. The health care professional will counsel the employee concerning his or her infectious status, including results of and interpretation of all tests, will discuss with the employee the potential risk of infection, and the need for postexposure prophylaxis and the protection of personal contacts.

Post-Exposure Prophylaxis — The licensed health care professional shall prescribe appropriate prophylactic measures, when medically indicated, as recommended by the U.S. Public Health Service.

Note: Since post-exposure testing and prophylaxis is a rapidly

changing and developing field, it must be provided according to the recommendations of the U.S. Public Health Service current at the time post-exposure testing and prophylaxis take place. The follow-up process may involve multiple visits to the HCP for serial blood tests, monitoring of medications (if prescribed) etc.

For example, for employees who have not received the HBV vaccine series, the HBV vaccine (and in some circumstances hepatitis B immune globulin) is to be offered as soon as possible after the exposure incident, but no more than seven days after the incident.

In addition, for HIV, the 1996 CDC guidelines state that "chemoprophylaxis should be recommended to exposed workers after occupational exposures associated with the highest risk of HIV transmission. For exposures with a lower, but non-negligible risk, postexposure prophylaxis should be offered, balancing the lower risk against the use of drugs having uncertain efficacy and toxicity. For exposures with negligible risk, postexposure prophylaxis is not justified."

Evaluation of Reported

Illnesses — The health care professional shall also evaluate any reported illnesses of the exposed employee to determine if the symptoms may be related to HBV or HIV infection. This provision ensures that exposed employees will have the benefit of early medical evaluation and recommended treatment and prophylaxis in a timely manner.

Note: *This requirement should*

not be construed to mean that the dental employer is responsible for the cost of treatment of disease, which is beyond the scope of the standard's follow-up requirements.

HCP's Written Opinion — After the health care professional completes the evaluation, he or she is required to send the dental employer a written opinion. The standard requires that the health care professional's written opinion contain only: documentation that the exposed employee was informed of the test results of the evaluation; and the need for further follow-up. If HBV vaccination is provided as part of the post-exposure prophylaxis, the opinion should also state whether HBV vaccine was indicated for the employee and if the employee was vaccinated. All other findings or diagnoses must remain confidential and shall not be included in the written report.

The dental employer must provide a copy of the evaluating health care professional's written opinion to the exposed employee within 15 days of the completion of the evaluation. The original document should be placed in the employee's confidential medical record.

Medical Recordkeeping —

The dental employer must establish and maintain medical records in a confidential manner. The standard does not require the employer to maintain possession of the records. If the medical records are left in the possession of the HCP who provides the follow-up protocol, it is the employer's responsibility to arrange with the HCP to maintain and keep the records confi-

dential in accordance with the standard.

Records must be maintained for the duration of employment plus 30 years in accordance with OSHA's standard on Access to Employee Exposure and Medical Records, 29 CFR 1910.20.

Under the standard, dental employers may have to rely on the health care professional to carry out certain OSHA obligations, such as maintaining employee medical records in a confidential manner, retaining the records for the duration of employment plus 30 years and providing appropriate post-exposure evaluation and follow-up services. The dental employer has an obligation to ensure compliance with the standard. However, he or she will not generally be held liable for violations resulting from the health care professional's actions if the dental employer has acted in good faith to contract with a responsible entity and has no reason to foresee that the contractor will not fulfill its obligations.

ADDITIONAL MATERIAL PROVIDED

For your further information, the following documents are also provided:

- A flow chart providing visual step-by-step guidance to the standard's requirements for post-exposure evaluation and follow-up.
- Sample "Questions and Answers" addressing potential dental employer concerns.
- A Reference List, including OSHA publications, as well as relevant CDC guidelines and recommendations.

FLOW CHART

Exposure Incident Occurs



EMPLOYEE

EMPLOYER

HEALTH CARE PROFESSIONAL (HCP)

— Reports Incident To
Employer



— Directs Employee to HCP



— Evaluates Exposure
Incident

- Sends to HCP:
 - Copy of Standard Job Description of Employee
 - Incident Report (Route etc.)
 - Source Patient's Identity and HBV/HIV Status (if known)
 - Employee's HBV Status and Other Relevant Medical Information
- Document Events on OSHA 200 and 101 (if applicable)

- Arranges for Testing of Exposed Employee and Source Patient (if not already known)
- Notifies Employee of Results of All Testing
- Provides Counseling
- Provides Post-Exposure Prophylaxis, if medically indicated
- Evaluates Reported Illnesses
(Items Above are CONFIDENTIAL)



- Receives HCP's Written opinion



- Sends (Only) the HCP's Written Opinion to Employer:
 - Documentation that employee was informed of evaluation results and the need for any further follow-up; and
 - Whether HBV vaccine is indicated and if vaccine was received



- Receives copy of HCP's Written Opinion



- Provides Copy of HCP's Written Opinion to Employee (within 15 days of completed evaluation)

Prepared by the American Dental Association in cooperation with the Occupational Safety and Health Administration (December 1997). This document is not considered a substitute for any provisions of the Occupational Safety and Health Act of 1970 or for any standards issued by OSHA.

Post-Exposure Evaluation and Follow-Up Requirements under OSHA's Standard for Occupational Exposure to Bloodborne Pathogens

Questions and Answers for Dental Employers

Selection of Health Care Professional — May the dental employer select the health care professional?

Yes, it is the dental employer, rather than the employee, who is entitled to select a health care professional to provide the hepatitis B vaccination and post-exposure evaluation and follow-up services required under the standard. Dental employers would be wise to select a health care professional who is familiar with the standard and the recommended post-exposure evaluation and follow-up protocol. The U.S. Public Health Service recommends that when possible, the medical evaluation and follow-up should be implemented in consultation with persons having expertise in antiretroviral therapy and HIV transmission. On this basis, the dental employer should identify, and have on record, a health care professional with appropriate expertise, or a health care professional who consults with a person having such expertise.

Employer Obligation Related to CDC Recommendations — *Since the standard incorporates by reference the CDC recommendations for post-exposure prophylaxis, what is the dental employer's obligations when the CDC guidelines are not clear or when the health care professional recommends*

treatment beyond what is contained in the CDC guidelines?

Under the standard, it is the dental employer's responsibility, following an exposure incident, to make immediately available to the exposed employee post-exposure prophylaxis, when medically indicated. The standard requires that post-exposure prophylaxis be provided in accordance with the recommendations of the U.S. Public Health Service, but it does not cite specific recommendations.

OSHA intentionally drafted the standard in this fashion to ensure that the most current recommendations would be followed. Because post-exposure testing and prophylaxis are rapidly changing and developing fields, it must be provided according to recommendations of the U.S. Public Health Service current at the time post-exposure testing and prophylaxis take place.

Currently, for employees who have not received the HBV vaccine series, HBV vaccine (and in some circumstances hepatitis B immune globulin) is to be offered as soon as possible after the exposure incident, but no more than seven days after the incident.

With regard to HIV disease,

CDC guidelines for post-exposure antiretroviral drug therapy are constantly evolving. The HCP providing post-exposure evaluation and follow-up must ensure that current CDC guidelines are followed. In order to assist the evaluating HCP in following CDC guidelines, the dental employer must ensure that the exposed employee receives **immediate** post-exposure evaluation (according to the CDC, preferably within 1-2 hours, but no longer than 24 hours) after the exposure incident.

Note: *The recommendations of the U.S. Public Health Service provides guidelines for post-exposure chemoprophylaxis. However, the use of post-exposure chemoprophylaxis is a clinical decision which should be individualized for each employee incident.*

Changes to CDC Recommendations — *How will dentists know of changes in the CDC guidelines that affect their OSHA obligations?*

CDC guidelines and recommendations are widely distributed and readily available to health care professionals either directly from the CDC or through professional associations. Direct subscriptions to the Morbidity and Mortality Weekly Report (MMWR) are available. Due to the ever-changing nature of the health care industry, professionals routinely seek to keep themselves abreast of new de-

Prepared by the American Dental Association in cooperation with the Occupational Safety and Health Administration (December 1997). This document is not considered a substitute for any provisions of the Occupational Safety and Health Act of 1970 or for any standards issued by OSHA.

velopments. Therefore, OSHA does not anticipate that either dental employers or evaluating health care professionals will have any difficulty in obtaining any future CDC guidelines or recommendations. [See References.]

Confidentiality — *Why is the dental employer denied access to the HBV or HIV test result of the employee and the source patient? How can the dental employer obey state laws implementing CDC guidelines on the practice of infected health care workers if the dentist is not entitled to know the employee's test results following an exposure incident?*

It is very important to maintain confidential medical records to ensure that employees report exposure incidents and participate in post-exposure evaluation and follow-up. The standard requires that medical records be kept confidential and not disclosed without the employee's consent, except as required by the standard or as may be required by law. For example, if a law requires the information to be released to a county or state health department, the standard does not prohibit its release.

In addition, the standard does not prohibit the dental employer from providing routine testing of all of his or her employees to determine HBV and HIV status. Such routine testing would enable dental employers to

learn the HBV and HIV status of all their employees, not just those few who suffer an exposure incident. Dental employers should be aware, however, that Federal, state or local laws that prohibit discrimination against the disabled may make it illegal to conduct routine employee testing. No dental employer should implement such a program without first obtaining the advice of his or her own personal attorney.

Source Patient Consent — *Could the dental employer's obligation to document the identity of the source patient and to provide the source patient's test results to the exposed employee conflict with state confidentiality laws?*

The standard requires testing of the source patient's blood for HIV and HBV, and disclosure of the results to the exposed employee, only where it is permitted and not in conflict with applicable laws or regulations. The standard further requires that the exposed employee be informed of any laws or regulations concerning disclosure of the identity and infection status of the source patient. The standard does not, therefore, require dental employers to violate any applicable privacy laws.

Medical Records — *May the dental employer make arrange-*

ments for the evaluating health care professional to maintain the required confidential employee medical records?

Yes. The bloodborne pathogens standard allows for such arrangements. The dental employer may simply contract with the health care professional who performs the HBV vaccination or post-exposure evaluation and follow-up to maintain the records as part of the service he or she is providing, much like the records that dentists maintain for their own patients. While the standard requires that employers establish and maintain for each employee confidential medical records that include the HBV vaccination status and evaluation and follow-up of exposure incidents, the records need not be kept at the place of employment. The records must, however, be maintained in a manner that makes them accessible to OSHA.

Note: *In accordance with OSHA's Standard for Access to Employee Exposure and Medical Records, 29 CFR 1910.1020, employee medical records must be accessible to both the employee (or the employee's representative) and OSHA representatives. To fulfill this obligation, the dental employer must assure that the requestor has the opportunity to examine the relevant*

employee medical records within a reasonable time (i.e., within 15 working days).

Employer Obligation to Former Workers — *What obligation does the dental employer have to pay for post-exposure evaluation and follow-up services after the exposed employee leaves the dentist's employment?*

The standard requires the dental employer to make **immediately** available a confidential medical evaluation and follow-up to an employee reporting an exposure incident. Due to the immediate nature of this requirement, it is not likely that the worker will end his or her employment prior to initiation of the post-exposure evaluation and follow-up. Once an employee ends his or her term of employment, however, the dental employer would no longer be obligated to meet the requirements of the standard since the employer-employee relationship no longer exists. However, employers should be aware that state workers' compensation laws may apply even after the employer-employee relationship ceases.

Temporary Workers Provided by an Employment Agency — *When temporary workers are provided through an employment agency, what obligation does the dental employer have to provide post-exposure evaluation and follow-up services?*

With regard to temporary workers, all requirements of the standard are applicable. In the

case of temporary workers provided through a personnel service, the employer who supplies the workers ("supplying employer") and the client facility to which they supply workers ("using employer") have a shared responsibility to ensure that workers are protected from workplace hazards. The supplying employer, who maintains the continuing relationship with the workers, is required to ensure that all workers are provided with the required vaccinations and follow-up evaluations. The using employer will not be held responsible for providing the required vaccinations and follow-up evaluations unless the contract specifies that the using employer will do so.

Potential Patient Anxiety — *The standard requires source patient testing, if feasible, following an exposure incident. Couldn't this requirement interfere with the doctor-patient relationship and cause patient anxiety due to possible misinterpretation of the request (i.e., that the patient rather than the employee has been potentially exposed)?*

Testing of the source patient whenever possible is very important to minimize the anxiety employees experience after exposure incidents. Testing for a source patient's infectious status provides exposed employees with information that will assist them in decisions regarding testing of their own blood, complying with other elements of post-exposure management, and using precautions to prevent transmission to personal con-

tacts. In addition, such testing assists the health care professional in deciding on appropriate follow-up.

We recognize that some dentists may have concerns about potential patient fears; however, we note that the standard is designed to prevent occupational exposure to blood or OPIM and, if properly implemented, exposure incidents will be uncommon events. If an exposure incident does occur, much can be done to eliminate or reduce patient anxiety. Medical professionals must often convey sensitive or unpleasant information to patients and have learned to do so without unduly alarming patients.

For example, when a health care professional treats a patient in a dental office or in any other medical setting, he or she typically explains office procedures and policies to the patient prior to providing services. OSHA suggests that as a part of this discussion, it would be appropriate for the dental employer to explain the standard's requirements for source patient testing to determine if the employee has been exposed. Thoroughly discussing this issue prior to, or at the time of, an exposure incident will likely reduce patient anxiety and possible misunderstandings.

Employer Obligation for Medical Treatment — *What obligation does the dental employer have to pay for medical treatment of a disease acquired as a result of an exposure incident?*

The standard requires the employer to make available testing, post-exposure prophylaxis

(when medically indicated), counseling and evaluation of reported illnesses. Treatment of disease is beyond the scope of the standard's follow-up requirements. [Treatment of disease is generally handled under workers' compensation or other disability insurance.]

Responsibility for Obtaining Written Opinion — *What happens if the health care professional fails to provide a written opinion as required by the standard? Might the dental employer be held responsible?*

As noted previously, the dental employer may have to rely on the health care professional to

carry out certain OSHA obligations, such as providing appropriate post-exposure evaluation and follow-up services, including providing a written opinion to the dental employer. The dental employer is responsible for providing the health care professional with pertinent information (see Information Provided to the HCP, page 3; Flow Chart, page 5). In particular, the dental employer must ensure that the health care professional understands the requirements of the standard and agrees to comply.

It remains, however, the dental employer's obligation to ensure that he or she obtains and pro-

vides the exposed employee with a copy of the health care professional's written opinion. Failure of the dental employer to obtain the written opinion generally constitutes a violation of the standard. However, the dental employer will not generally be held liable for such violations if the dental employer can demonstrate good faith efforts to obtain the written opinion (i.e., by documented phone calls or written communication to the health care professional). In this way, the dental employer shows that he or she clearly tried to comply with the intent of the standard, and a violation may not exist. ■

Post-Exposure Evaluation and Follow-Up Requirements under OSHA's Standard for Occupational Exposure to Bloodborne Pathogens

References

OSHA Documents:

- *Occupational Exposure to Bloodborne Pathogens Final Rule*, December 6, 1991 (29 CFR 1910.1030).
- Booklet: *Controlling Occupational Exposure to Bloodborne Pathogens in Dentistry*, OSHA Publication No. 3129 (1992).
- Booklet: *All About OSHA*, OSHA Publications No. 2056 (1992).
- Booklet: *Access to Medical and Exposure Records*, OSHA Publication No. 3110.
- Fact Sheet: *Bloodborne Pathogens Final Standard*, Program Highlights 92-46.
- Bloodborne Facts: *Reporting Exposure Incidents*.
- Bloodborne Facts: *Hepatitis B Virus Vaccine - Protection for You*.
- Bloodborne Facts: *Protect Yourself When Handling Sharps*.
- Bloodborne Facts: *Personal Protective Equipment Cuts Risk*.
- Bloodborne Facts: *Holding the Line on Contamination*.
- Video: *As It Should Be Done*.

Note: For a single free copy of OSHA booklets or fact sheets, please write, call, or fax your request to:
OSHA Publications Office
200 Constitution Avenue, N.W., Room N3101
Washington, D.C. 20210
(202) 219-4667, FAX (202) 219-9266.

The training video *As It Should Be Done: Workplace Precautions against Bloodborne Pathogens* order No. AVA19111VNB1, is available from the:
National Technical Information Service
Tel. No. (703) 487-4650

(The video is also available as a free loan from most OSHA regional offices or from OSHA's Office of Information and Consumer Affairs, tel. no. (202) 219-8151).

Centers for Disease Control and Prevention (CDC) Morbidity and Mortality Weekly Reports (MMWR):

- Centers for Disease Control and Prevention. "Update: Provisional Public Health Recommendations for Chemoprophylaxis After Occupational Exposure to HIV." MMWR June 7, 1996; Vol. 45 (No. 22).
- Centers for Disease Control. "Public Health Service Statement on Management of Occupational Exposure to Human Immunodeficiency Virus, Including Considerations Regarding Zidovudine Postexposure Use." MMWR January 26, 1990; Vol. 39 (No. RR1).
- Centers for Disease Control. "Protection Against Viral Hepatitis: Recommendations of the Immunization Practices Advisory Committee (ACIP)." MMWR February 9, 1990; Vol. 39 (No. S-2).
- Centers for Disease Control and Prevention. "Recommendation for HIV Testing Services for Inpatients and Outpatients in Acute-Care Hospital Settings and Technical Guidance on HIV Counseling." MMWR January 15, 1993; Vol. 42 (No. RR-2).
- Centers for Disease Control and Prevention. "Recommended Infection-Control Practices for Dentistry, 1993." MMWR May 28, 1993; Vol. 42 (No. RR-8).
- Centers for Disease Control. "Recommendations for Prevention of HIV Transmission in Health Care Settings." MMWR August 21, 1987; Vol. 36 (No. S-2).
- Centers for Disease Control. "Public Health Service Guidelines for Counseling and Antibody Testing to Prevent HIV Infection and AIDS." MMWR August 1987; Vol. 36.
- Centers for Disease Control. "1988 Agent Summary Statement for Human Immunodeficiency Virus and Report on Laboratory-Acquired Infection with Human Immunodeficiency Virus." MMWR April 1, 1988; Vol. 37 (No. S-4)
- Centers for Disease Control. "Update: Universal Precautions for the Prevention of Transmission of HIV, HBV, and Other Bloodborne Pathogens in Health Care Settings." MMWR June 24, 1988; Vol. 37 (No. 24).
- Centers for Disease Control. "Guidelines for Prevention of Transmission of Human Immunodeficiency Virus and Hepatitis B Virus to Health-Care and Public Safety Workers." MMWR June 23, 1989; Vol. 38 (No. S-6).
- Centers for Disease Control. "Hepatitis B Virus: A Comprehensive Strategy for Eliminating Transmission in the United States Through Universal Childhood Vaccination." MMWR November 22, 1991; Vol. 40 (RR-13).

Note: CDC guidelines and recommendations are widely distributed and readily available to health care professionals. For example, direct subscriptions to the Morbidity and Mortality Weekly Report are available, and many other organizations and professional associations reprint the material in their publications. Dental employers are encouraged to provide these recommendations to employees and to those providing services in the event of an exposure. Familiarity with these guidelines ensures that the decision to begin prophylaxis is well informed and based on sound judgement regarding the risks and benefits.

For current information on the U.S Public Health Service's recommendations and for other information, dentists may call the Centers for Disease Control and Prevention (CDC):
Disease Information Hotline (404) 332-4555
National AIDS Clearinghouse 1-800-458-5231

Prepared by the American Dental Association in cooperation with the Occupational Safety and Health Administration (December 1997). This document is not considered a substitute for any provisions of the Occupational Safety and Health Act of 1970 or for any standards issued by OSHA.

Chapter 5



Psychosocial and Ethical Issues Related to Dental Care of Patients with HIV/AIDS



Workshop Leader:

Barbara Gerbert, Ph.D., UC-San Francisco School of Dentistry, San Francisco, California

Participants:

Gary Chiodo, D.M.D., OHSU School of Dentistry, Portland, Oregon

Carolyn F. Gray, American Association of Dental Schools, Washington, D.C.

Lewis Lampiris, D.D.S., M.P.H., Chicago, Illinois

Debbie Lewis, B.D.S., Kings Dental Hospital, London, UK

Vincent C. Rogers, D.D.S., M.P.H., Temple University School of Dentistry, Philadelphia, Pennsylvania

Professionals in all health care fields are held to high standards of practice and basic principles of health care ethics. Dental health care professionals are taught to adhere to the dental profession's code of ethics and agree to maintain these standards for the benefit of all patients and for the good of the profession. The specter of HIV infection and AIDS, however, with the accompanying medical complexity and fears about transmission, has challenged dental health care professionals to revisit and restate their ethical obligations.

Dental health care professionals confront unique psychosocial and ethical issues while they practice in the midst of the AIDS epidemic. The following are six basic principles of health care ethics and professional behaviors by which the dental health care professional should be guided.



All dental health care professionals have an ethical obligation to care for persons with HIV disease.

Because the numbers of persons infected with HIV continues to rise and infected persons are living longer, all health care professionals will be called upon to deliver primary care to this population.

All patients and dental health care professionals benefit when the dental care provider collaborates with all other members of the patient's primary health care team.

This interdisciplinary approach to care optimizes the potential for a positive health outcome for the patient.

Dental health care professionals must assure all patients of provider-patient confidentiality.

Because of the potential for discrimination based on the disclosure of a positive HIV serostatus, the duty to maintain confidentiality is critical. The dental health care professional may be required by state laws to obtain written consent from the patient in order to disclose HIV-related information to other healthcare professionals.

Numerous benefits and difficulties are encountered when treating patients who are HIV infected.

Dental health care professionals are academically and intrinsically rewarded for treating this population of medically complex patients. Conversely, the potential of "burnout" must be recognized and addressed.

The relationship between the HIV-infected patient and his or her dental health care provider should be built on mutual trust and open, honest communication.

Within the context of a supportive provider-patient caring relationship, the dental health care professional should assess the implications to the patient's health of his or her current risk behaviors, including sexual activity and alcohol and other drug-use, as well as the potential for other risk behaviors. Risk reduction models should be included in these discussions when appropriate.

The dental health care professional should strive for informed decision making by the patient.

To ensure that the patient is a participant in health-care decisions, the dentist must assess the patient's decision-making capacity. Since some AIDS-related illnesses can affect the patients' cognitive processes, the following questions may help dental health care professionals ascertain the level of involvement they can expect from the patient regarding decisions about treatment:

- 1) Can the patient communicate a stable choice?
- 2) Can the patient understand the relevant information?
- 3) Does the patient express an understanding of his or her current situation and its consequences?
- 4) Can the patient rationally manipulate the information provided?

SELECTED BIBLIOGRAPHY

Americans with Disabilities Act, Public Law 101, No. 336 (July 13 1990).

Chiodo GT, Tolle SW. The ethical foundations of a duty to treat HIV-positive patients. *Gen Dent* 1997; 45:14-6,18, 20 passim.

Chiodo GT, Tolle SW. When AIDS and ethics meet: Dentistry's obligation to treat all patients. *Dent Teamwork* 1993; 6:20-6.

Gerbert B, Bleecker T, Miyasaki C, Maguire BT. Possible health care professional-to-patient HIV transmission. *JAMA* 1991; 265:1845-8.

Gerbert B, Sumser J, Chamberlin K, Maguire B, Greenblatt R, McMaster J. Dental care experiences of HIV-positive patients. *JADA* 1989;119:601-3.

Glick M, Burris S. The professional responsibility for care. *Oral Dis* 1997;3 (Suppl):S221-4.

Graham PE, Miller NM, Harel-Raviv M. The law and ethics in relation to dentists treating HIV-positive patients: Two recent court cases. *J Can Dent Assoc* 1995; 61:487-91.

Graham PE, Harel-Raviv M. The law and ethics in dentistry: A recent human rights tribunal judgment with further guidelines concerning dental treatment of HIV-positive patients. *J Can Dent Assoc* 1995; 61:871-4.

Kunzel C, Sadowsky D. Assessing HIV-related attitudes and orientations of male and female general dentists. *JADA* 1995; 126:862-71.

Neidle EA. Infectious disease in dental practice--professional opportunities and obligations. *J Am Coll of Dentists* 1994;61:12-7

Sadowsky D, Kunzel C. Predicting dentists' willingness to treat HIV-infected patients. *AIDS Care* 1996:581-8.

Sfikas JD. Patient rights, provider rights: balancing the conflict. *JADA* 1997;128:763-6.

Shuman SK; Bebeau MJ. Ethical and legal issues in special patient care. *Dental Clinics of North America* 1994;38:553-75.