CME AND DENTAL-ACCREDITED
SELF-STUDY MODULE

Caring for the HIV-Infected Inmate Series

E D I T I O N 7

Oral Lesions and Treatment Recommendations
for the HIV-infected Incarcerated Patient

Release Date: December, 2010
Continuing Education Credit Expiration Date: June 30, 2011
Photocopying contents of this document is allowed. Copyright waived.
TARGET AUDIENCE
Physicians, physician assistants, pharmacists, nurse practitioners, nurses, dentists, dental hygienists, dental assistants and other interested medical providers

LEARNING OBJECTIVES
After reading this self-study module, you should be able to:
1. Identify clinically relevant oral lesions associated with HIV.
2. Determine when further testing is indicated and which tests should be performed.
3. Discuss medications and treatment options available for candidiasis, human papillomavirus (HPV) and xerostomia.
4. Describe when and how to consult with and refer patients to individuals for more specialized care.

AUTHOR
Gwen Cohen Brown DDS, FAAOMP
Associate Professor
Department of Dental Hygiene
New York City College of Technology, CUNY
Brooklyn, New York

ACKNOWLEDGEMENTS
This resource is a collaborative initiative among the Division of HIV Medicine at Albany Medical College and the New York State Department of Health AIDS Institute’s Oral Health Regional Resource Center under the New York/New Jersey AIDS Education & Training Center.

This resource is funded in part by the U.S. Department of Health and Human Services, Health Resources and Services Administration, HIV/AIDS Bureau.

DENTAL ACCREDITATION

DENTISTS: The New York State Dental Foundation approved by the NYSDA and the ADA CERP is an approved provider for dental continuing education in conjunction with NY/NJ AETC’s Oral Health Regional Resource Center of the New York State Health Department/AIDS Institute.

HYGIENISTS: The Dental Hygienists’ Association of the State of New York, Inc., an accredited approver by the New York State Department of Education has approved the NY/NJ AETC’s continuing education learning activities for New York dental hygienists.

OTHER CREDIT REQUIREMENTS
Continuing education credits are limited to those listed above. Disciplines with other continuing education requirements for their professional licenses are encouraged to submit evidence of their participation for reciprocity of credits. Please complete the forms at the end of this module to obtain an attendance certificate.

EDITORIAL BOARD

COURSE DIRECTORS
Douglas G. Fish, MD
MEDICAL DIRECTOR
AIDS Designated Center
Associate Professor of Medicine
Albany Medical College
Albany, New York

Cynthia H. Miller, MD
DIRECTOR, OUTPATIENT CLINICAL SERVICES
AIDS Designated Center
Assistant Professor of Medicine
Albany Medical College
Albany, New York

PROJECT MANAGERS
Sarah J. Walker, MS
ASSOCIATE DIRECTOR OF HIV CORRECTIONAL EDUCATION
Division of HIV Medicine
Albany Medical College
Albany, New York

Cheryl R. Stolarski, DMD
DENTAL CO-DIRECTOR
Oral Health Regional Resource Center
New York/New Jersey AIDS Education & Training Center
West Nyack, New York

Howard E. Lavigne, BS
PROGRAM DIRECTOR
Oral Health Regional Resource Center
New York/New Jersey AIDS Education & Training Center
Syracuse, New York

CORRECTIONAL EDITORS
Carl J. Koenigsmann, MD
DEPUTY COMMISSIONER & CHIEF MEDICAL OFFICER
New York State Department of Correctional Services
Albany, New York

Mary J. D’Silva, DDS
DIRECTOR OF CORRECTIONAL DENTAL SERVICES
New York State Department of Correctional Services
Albany, New York

FACULTY DISCLOSURE

Douglas G. Fish, MD

SPEAKERS’ BUREAU
Boehringer Ingelheim Pharmaceuticals, Inc.
Merck & Co., Inc.

CONSULTANT
Merck & Co., Inc.

RESEARCH
Gilead Sciences, Inc.
Merck & Co., Inc.
Tibotec Therapeutics

The following individuals have no financial arrangement or affiliation with any corporate organizations that offer financial support for continuing medical education activities:
Gwen Cohen Brown, DDS, Cynthia Miller, MD, Carl Koenigsmann, MD, Sarah Walker, MS, Cheryl Stolarski, DMD, Howard Lavigne, BS and Jennifer Price.
CARING FOR THE HIV-INFECTED INMATE: A CME AND DENTAL-ACCREDITED SELF-STUDY MODULE

To obtain education credit, a minimum of 70% of the questions must be answered correctly on the self assessment test at the end of this booklet. The estimated time for completion of this activity is 1 hour.

There is no fee for education credit. This learning activity is awarded 1.0 contact hour until June 30, 2011.

DIRECTIONS

1. Time yourself throughout all portions of this activity.
2. Read the enclosed module.
3. Take the self assessment test.
4. Fill out the program evaluation/reader information form including your name and address.
5. Fully complete the HRSA participant information form in black pen. Each bubble must be fully shaded.
6. To assure your receipt of education credit, please mail your completed self assessment test, program evaluation/reader information form and HRSA participant information form (3 pages total) to:

   Jim Ybarra
   Albany Medical College
   47 New Scotland Avenue, Mail Code 158
   Albany, NY 12208

CME Credit/Certificate Questions:
Contact Jim Ybarra at 518.262.4674 or ybarraj@mail.amc.edu

Dental Credit/Certificate Questions:
Contact Howard Lavigne at 315.477-8479 or hel01@health.state.ny.us
Module Abstract

According to the 2008 World Health Organization (WHO) report, close to 33.8 million people worldwide are living with HIV/AIDS. Since the first case of AIDS was reported in 1981, the presence of oral manifestations of HIV infection has had a significant role in the morbidity and mortality of HIV seropositive patients. (1, 2) Oral lesions occur in 30 - 80% of the affected patient population and their presence directly affects patients’ quality of life. (3) The presence of oral lesions is strongly associated with a high viral load > 20,000 copies/mL, low CD4 cell count <200 cells/mm^3 and treatment failure.

Highly active antiretroviral therapy (HAART) has decreased the incidence, frequency, and severity of most, but not all, HIV-associated oral lesions. The focus of this module is the clinical presentation, diagnostic criteria, current treatment modalities and prognosis of the following HIV-associated oral pathologies: oral candidiasis, human papilloma virus (HPV)-related lesions, salivary gland disease and xerostomia. These oral diseases present diagnostic and therapeutic hurdles, are challenging for both the clinician and the patient, and correlate with significant prognostic impact. Inaccurate diagnosis, lack of treatment or inappropriate treatment may result in considerable patient morbidity and potential mortality.

Introduction

HAART was introduced as a first-line therapy in 1996. HAART is a combination drug regimen that targets and interferes with viral cell (HIV) replication, thereby reducing viral load and increasing the CD4/CD8 ratio. The introduction of HAART has dramatically changed the overall course of HIV infection; patients are living longer, healthier lives with fewer opportunistic infections and AIDS-defining diseases. (3) HAART has decreased the prevalence, rate of recurrence, and severity of most, but not all, systemic HIV-associated disease. (4) HAART has also significantly reduced the overall frequency of oral lesions in HIV seropositive patients.

In the pre-HAART era, approximately 10% of HIV seropositive patients developed an oral lesion as the initial clinical sign of immune suppression, and oral candidiasis and hairy leukoplakia were considered indicators of disease progression to AIDS. (5) Following the introduction of new antiretroviral therapies in the late 1990s, there was a shift in the incidence and prevalence of most HIV-associated oral lesions. Paradoxically, salivary gland disease, xerostomia, and HPV-related lesions are seen in statistically significant increasing frequency in patients on HAART.

Most researchers consider the proliferation of oral HPV-related lesions and salivary gland disease to be a direct result of the efficacy of HAART. These pathologies increase with the patient’s ability to mount an inflammatory response. This process, referred to as the immune reconstitution syndrome, may lead to increased frequency and severity of select oral lesions. (6, 7, 8, 9, 10) For individual patients, changes in disease presentation or progression may also indicate increase in HIV viral resistance, non-adherence with medication or HAART failure.

HIV-Associated Oral Pathology

The oral lesions associated with HIV disease have traditionally been classified by etiology, degree of immune suppression, intensity and clinical features. Over the past thirty years, numerous systems have been developed to recognize, diagnose, manage, organize, classify and categorize the oral manifestations of HIV disease. These classification schemas reflect disparate approaches and differing intent: epidemiologic survey vs. clinical/medical guidelines, etiology vs. degree of association with HIV infection, clinical presentation (staging) vs. definitive biopsy diagnosis, and inclusion of CD4+ T-lymphocyte/viral load vs. exclusion of laboratory data. Conflicting methodology, interests and pedagogy resulted in inconsistent classification systems with often non-comparable data.

In 1989, Pindborg proposed one of the first classification systems for oral lesions associated with HIV infection. (11) The system was based on lesion etiology/pathogenesis and intended for use in epidemiological studies, not clinical practice. Oral lesions were grouped by type: fungal, viral, bacterial, neoplastic, neurological and other (unknown). At the time of publication, 30 oral lesions, many published as individual case reports, were known to be associated with HIV disease.

The European Community (EC) Clearinghouse/WHO publication “Classification and diagnostic criteria for oral lesions in HIV infection” is
the most widely accepted and utilized epidemiological classification system for oral lesions worldwide. (12, 13) Developed in the early 1990s, the EC-WHO system classifies oral lesions present in HIV positive patients into three groups according to prevalence, relative frequency, intensity and clinical features of the lesion. Group 1 is composed of lesions that are strongly associated with HIV infection; Group 2 lesions are less commonly associated with HIV infection and Group 3 lesions are probably associated with HIV.

Although appropriate for the times, the parameters set forth in the EC-WHO publication are almost twenty years old and may not accurately reflect current diagnostic criteria, therapeutics and knowledge. Review of recent literature calls for revisiting, updating, standardizing and calibrating the classification system to include case-based, medicine-based and laboratory-based evidence. (14, 15, 16, 17) There is a recognized need for a clinically-based classification system for HIV-associated oral disease that incorporates epidemiology, clinical presentation, etiology/pathogenesis, stage of disease progression and therapy.

In 2005 (at the 5th World Workshop on Oral Health and Diseases in AIDS), the *ODHIS Workshop Group, Dental Alliance for AIDS/HIV Care, proposed a classification system for HIV-associated oral lesions based upon degree of immune suppression. (18) Group 1 lesions are associated with severe immune suppression CD4<200 cells/mm³, Group 2 lesions are associated with immune suppression CD4<500 cells/mm³ and Group 3 lesions are assumed to be associated with immune suppression. The classification system also includes two groups not previously identified in the EC-WHO classification system; Group 4 includes therapeutically-induced oral disease and Group 5 includes emerging oral diseases. Although not absolute, as oral lesions can present at different levels of immune suppression, the ODHIS classification system recognizes the prognostic significance of oral disease by correlating specific oral lesions to degree of immunosuppression and decreasing CD4 counts. This is a clinical, not epidemiological, approach to classifying HIV-associated oral disease.

The Oral HIV/AIDS Research Alliance (OHARA), as part of the AIDS Clinical Trial Group, recently published (2009) updated case definitions of oral disease endpoints based upon modification of the 1992 and 1993 EC-WHO criteria. (19) Oral lesions are presented by etiology (pathogenesis), clinical descriptors including color, character, extent and location, patient-reported symptoms and duration of clinical findings, and whether definitive diagnosis by biopsy is required.

Oral lesions are also included in the Centers for Disease Control (CDC) and WHO classification systems for HIV/AIDS systemic disease. Oral candidiasis and oral hairy leukoplakia are considered HIV-associated symptomatic diseases in HIV seropositive patients and have been included in the clinical classification of HIV by CDC in category B. (20) The WHO developed a staging system for HIV disease intended for use in epidemiological studies of the oral conditions associated with HIV infection. Oral lesions were organized by clinical presentation and symptoms rather than CD4 count and viral load test results. (21)

**Oral Candidiasis**

Oral candidiasis, colloquially referred to as ‘thrush’, is a common fungal infection that may present in both immunocompetent and immunocompromised patients. It is associated with numerous local and systemic conditions including immunosuppression, HIV infection, chemotherapy, poorly controlled diabetes, xerostomia, and denture stomatitis. Oral candidiasis may result in pain on swallowing, oral discomfort, localized swelling, bitter or sour taste and loss of function. Oral candidiasis is most often due to the yeast *Candida albicans*, although non-albicans species have also been reported. Since *Candida albicans* is a normal component of the oral flora, oral candidiasis is more of a ‘super-infection’ resulting from an overgrowth of the fungal organisms rather than a true infection. Oral candidiasis presents in both acute and chronic forms and occurs as a result of alterations in oral flora.

Immune compromised patients lack the systemic and local immunity to prevent the conversion of yeast from a harmless colonizer to opportunistic or invasive pathogen. (22) In HIV seropositive patients, the incidence of candidal carriage may increase and patients with asymptomatic oral candidiasis may demonstrate a rapid conversion to symptomatic infection. (23) Historically, pre-HAART oral candidiasis was present in up to 90% of HIV seropositive patients. (24) It is one of the most common fungal infections observed in the initial manifestation of symptomatic HIV infection.

Oral candidiasis may be an indicator of early HIV infection and may predict advancing immunodeficiency. Without appropriate treatment, candidiasis may spread to the esophagus resulting in invasive esophageal candidiasis, an AIDS-defining disease. (25) Although the incidence of oral candidiasis has significantly declined in patients with access to antiretroviral therapy, it remains a problem for patients with limited access to medication and may be seen in patients with a poor response to HAART. (14)

Oral candidiasis is typically observed as CD4 counts fall below 500/µl. The presence of oral candidiasis in HIV seropositive patients can be a useful clinical marker for high viral load and low CD4 percentage. (26) It has been suggested that co-infection with HIV and candida may affect both the severity and rate of HIV disease progression in HIV seropositive individuals. (27) Some authors have suggested that an HIV viral load greater than 10,000 copies/mL is the most predictive factor in the development of oral candidiasis. (28)
1. **Acute Pseudomembranous Candidiasis (Thrush):** Presents as white, curd-like plaques that easily wipe away leaving a raw, red or bleeding surface. May occur throughout the oral cavity and pharynx and is frequently asymptomatic (Figure 1)

2. **Acute Atrophic Candidiasis:**
   Presents as flat/slightly raised erythematous macules, often seen first on the soft palate. Often precedes the development of pseudomembranous candidiasis. (Figure 2)

3. **Chronic Denture Stomatitis:**
   Presents in older adults and is typically located under dentures as edematous erythematous tissue immediately subjacent to denture base. May also present with papillary hyperplasia of the palate. (Figure 3)

4. **Chronic Median Rhomboid Glossitis:**
   Presents as flat/slightly raised erythematous depapillated rhomboid shaped lesion on the middle third/midline dorsal surface of the tongue. (Figure 4)

5. **Chronic Angular Cheilitis:** Presents as perioral erythema and/or cracking, fissuring and superficial ulceration at the corners/commissures of the mouth. (Figure 5)

There are four frequently observed presentations of oral candidiasis in HIV seropositive patients: 1) acute pseudomembranous candidiasis (thrush), 2) acute atrophic candidiasis, 3) angular cheilitis, and 4) chronic atrophic candidiasis in the forms of denture stomatitis, papillary hyperplasia of the palate, and median rhomboid glossitis. The fifth clinical presentation of oral candidal infection, hyperplastic candidiasis, occurs less often and is a form of chronic candidiasis. Typically a diagnosis of candidiasis can be made on clinical presentation alone or by therapeutic diagnosis whereby the lesions resolve following appropriate drug management.

All photographs were taken by the author, Dr. Gwen Cohen Brown, courtesy of the Department of Dental Hygiene, New York City College of Technology.
Laboratory Tests Candidiasis

Laboratory tests can be used to confirm the clinical diagnosis of candidiasis, however, they are rarely done unless the lesion does not resolve following appropriate treatment. If lab tests are required, a potassium hydroxide stained cytologic preparation that demonstrates the fungal pseudohyphae penetrating the epithelial cells can be used for confirmation. Confirmation by biopsy and a periodic acid Schiff stain (PAS) is also possible, as the stain will turn the spores and pseudohyphae bright magenta, making them easily visible by light microscope. Fungal cultures are not typically used to confirm the diagnosis of oral candidiasis, as candida albicans is a normal component of the oral flora. (24)

If oral lesions fail to improve following appropriate therapy, a definitive diagnosis is indicated utilizing the above laboratory tests, and the possibility of a resistant strain of candida should be explored. (29) Prior antifungal drug treatment in either prophylactic or suppressive doses of fluconazole (50-100 mg/day) has contributed to the development of fluconazole-resistant candida albicans. (30) Since HAART for the treatment of HIV is widely available and utilized in the United States, routine primary prophylaxis of candidiasis is not indicated. (29) Chronic, suppressive therapy for patients with human immunodeficiency virus (HIV) is not always necessary. If suppressive therapy is required, fluconazole is recommended. (31)

Treatment Candidiasis

Oral candidiasis is treated with either systemic or topical antifungal medicine. The delivery format is relevant, as different therapeutic modalities are more successful in treating specific clinical manifestations of this disease. To determine which vehicle to use, both the clinical presentation and extent of the infection must be taken into account, as different agents may have preferential activity for each clinical appearance. (32) Topical therapies are indicated for limited and easily accessible, mild to moderate disease and superficial candidal infections. Systemic therapy is appropriate and effective for patients with moderate to severe candidiasis and/or invasive fungal infections.

Current recommendations from the Infectious Diseases Society of America (IDSA) 2009 (31) guidelines on the treatment of oropharyngeal candidiasis in adults state that topical agents are the drugs of choice for initial therapy in patients with a CD4 count greater than 200 cells/mm³. (33) When using topical agents, the level of drug concentration and contact time must be taken into consideration in order to allow the drug to penetrate the oral biofilm. (29) The efficacy of the antifungal medications depends upon a multitude of oral and systemic conditions. Coexisting factors such as xerostomia, salivary gland hypofunction, periodontitis, high HIV viral load and low CD4 counts can decrease the efficacy of the medication and can affect clinical outcomes. (34)

Systemic therapy with fluconazole, ketoconazole, or itraconazole may be considered for the initial treatment of moderate to severe disease oropharyngeal candidiasis. (30) For fluconazole-resistant disease, itraconazole solution or posaconazole suspension (Noxafitm), voriconazole (Vfendtm) or amphotericin B oral suspension may be administered.

Considerations and Concerns-Candidiasis

One consideration in the selection of an antifungal medication is the likelihood of a drug-drug interaction, as a large percentage of HIV seropositive patients are taking concomitant medications. Patients should not take antacids within two-hours of systemic oral azole therapy, as this will interfere with the absorption of the azole and decrease the antifungal properties. Chlorhexidine Gluconate 0.12% oral rinse has been reported to demonstrate antifungal properties. However, it cannot be used at the same time as topical Nystatin since the combination creates a nystatin-chlorhexidine salt precipitate. If both drugs must be used, they should be administered at least one-hour apart. (35)

It is important to remember that prolonged use of topical antifungal agents containing fermentable carbohydrate substrates may result in rapid tooth decay. Patients should be told to rinse their mouth with water after use of any topical antifungal medication containing sucrose. Patients with severe xerostomia or diabetes should be treated with vaginal Nystatin tablets, as they do not contain sucrose. (36)
Human Papilloma Virus (HPV) Related Lesions

HPV is one of the most prevalent viral infections worldwide, with several million new cases diagnosed every year. Currently there are more than 120 identified HPV subtypes, 30 of which have been detected in the oral cavity. (37) HIV seropositive individuals are more likely to carry HPV in the mouth than immune competent individuals and are more likely to be infected by more than one HPV genotype. (38) Oral HPV infection occurs at a higher rate among HIV-infected people than among the general population. The most common genotypes found in the mouth of patients with HIV infection are 2, 6, 11, 13, 16, and 32. (39)

Surveys comparing the incidence of oral and cutaneous HPV-related lesions in HIV seropositive patients (pre- and post-HAART eras) underscore the complexity of this issue. One report found that oral warts were six times more common in patients on HAART. (40) Other studies have linked the presence of oral warts with reductions in viral load. (41) Most researchers currently believe that this phenomenon is related to the Immune Reconstitution-associated Disease (IRAD) process. (42) The concept of IRAD seems counterintuitive in that more HPV lesions have been observed in HIV seropositive patients on HAART, in other words after restoration of the immune system.

The longer survival of HIV seropositive patients on HAART has also led to a high incidence and steady increase in HPV-related malignancies both in women and men. (43) Recent literature supports the role that high risk HPV subtypes such as 16 and 18 play in the etiology of oral and oropharyngeal squamous cell cancer (SCC). Although the association of oral cancer with HPV is clear, the epidemiology of oral HPV infection remains elusive, and it is still unknown how much of the data from cervical HPV infection can be extrapolated to oral HPV infection. (44) Long-term follow-up is needed to determine the risk of SCC developing from oral dysplastic warts. (45)

The data on emerging incidence and appropriate treatment modalities for oral HPV lesions in HIV seropositive individuals on HAART is still largely unknown. To this end, a large multicenter clinical study has been initiated through the National Institute of Allergy and Infectious Diseases (NIAID). The purpose of this study is to evaluate the frequency of oral HPV DNA shedding and oral warts in HIV-infected people prior to HAART initiation and at regular time points after HAART initiation. This study, ClinicalTrials.gov identifier: NCT01029249, is currently recruiting participants.

Clinical Presentation of Oral HPV-Related Lesions

Oral HPV-related lesions appear papillary with either a pedunculated or sessile stalk, and are often found on the palate, buccal mucosa, and labial commissures. (46) Condyloma may present as a solitary lesion, or more likely with multiple, florid, exophytic papillary lesions throughout the oral cavity and peri-oral tissues.

Clinical Presentation of Oral HPV

HPV/Condyloma Acuminatum: Multiple, papillary projections on the inner aspect of the lower labial mucosa. (Figure 6)

Treatment of HPV-Related Lesions

Treating oral HPV-related lesions in HIV seropositive patients can be a challenge, as there are no standardized treatment guidelines, nor is there a consensus on the efficacy of available current treatment modalities. There are few published reports on the treatment of oral HPV lesions and most have been case reports. None of the publications has been double-blinded, placebo-controlled or randomized. (47) The treatment of oral condyloma is difficult because of the number and distribution of the lesions, as well as their high recurrence rate.

Traditional treatments aim at the removal or desiccation of HPV lesions.
Although these procedures visually excise the lesion, they tend to recur due to persistence of the virus in clinically normal surrounding mucosal tissue. (48) Most treatment regimens have targeted extra-oral warts, and it is still unknown if these treatment regimens are transferable for the treatment of intraoral warts. Topical application of caustic or acid agents including cantharidin, podophyllin resin, tretinoin, topical 5-fluorouracil have been used with mixed results. Intralional bleomycin, interferon-alpha, imiquimod, etretinate, cimetidine, and zinc sulfate have all shown varying success as well. (46)

Salivary Gland Disease, Hyposalivation and Xerostomia

Salivary glands are affected in 2–10% of HIV seropositive patients. Clinical manifestations include hyposalivation and dry mouth, or xerostomia. It occurs either because of a reduction in the quantity of saliva produced or as a qualitative change. (51) Caries and periodontal disease reduce and alter the flow, composition and pH of saliva, while xerostomia increases the incidence of bacterial plaque, gingival bleeding and candidal organisms. (52)

Considerations and Concerns HPV Related Lesions

Cryosurgery, electrocautery or electrosurgery, YAG laser and CO2 laser come with their own set of problems. Although pain and bleeding are reduced with use of a laser or cautery, a smoke plume is produced which may contain HPV virions capable of infecting the patient and the surgeon. (49, 50) Ideally, all visible HPV lesions should be removed at the same time. If they are not, the likelihood is great that the open wounds will be re-seeded with virus and new lesions will develop at the surgical site.

Saliva aids in the chewing, swallowing and digesting of food. Salivary hypofunction may lead to changes in food and fluid selection that potentially may result in a compromised nutritional status. Saliva dilutes and washes away food debris, sugars and the acids produced by oral bacteria. Without saliva, the oral cavity is not ‘buffered’. Reduced salivary flow results in a lower, more acidic intraoral pH level that in turn increases the likelihood of tooth decay, periodontal disease and oral infections. For edentulous patients, saliva creates the vacuum pressure that is critical for the retention, adhesion and comfort of removable dentures. (57)
Treatment of Xerostomia

There seems to be little correlation between the patient’s subjective findings of dry mouth and objective testing of salivary flow rate, therefore clinical management can be difficult and primarily based on patient symptoms. The salivary flow rate will distinguish between the subjective feelings of xerostomia and the objective clinical presentation of hyposalivation.

If there is a decrease in the salivary flow rate, i.e. the glands are not working properly but still retain secretory function, sialogogues may be indicated. If the glands exhibit adequate salivary flow and the patient is feeling oral dryness, palliative care is indicated. (58, 59)

Lubricating agents in the form of gels, mouthwashes, sugarless gum and lozenges have been used, with varying degrees of success, to relieve the symptoms of xerostomia by increasing salivary output. (60) Salivary substitutes available by prescription also may alleviate the discomfort. Increasing fluoride percentage in mouth rinses and toothpastes can help prevent tooth decay in patients with hyposalivation.

Summary

HAART has significantly changed the clinical presentation of oral disease in HIV seropositive patients. Overall, patients are living healthier, longer lives with fewer complications from oral disease. However, oral HPV lesions, salivary gland disease, hyposalivation and xerostomia are on the rise and are proving to be complex and difficult to treat. Oral candidiasis remains a problem especially when coupled with decreased salivary flow. Oral HPV lesions do not yet have definitive treatment guidelines, and the association of oral squamous cell carcinoma with certain high-risk HPV subtypes found in oral warts will change the clinical paradigm and treatment methodology in the near future.

All photographs were taken by the author, Dr. Gwen Cohen Brown, courtesy of the Department of Dental Hygiene, New York City College of Technology.
<table>
<thead>
<tr>
<th>ANTIFUNGAL AGENT</th>
<th>INDICATION</th>
<th>DISPENSE (DISP)</th>
<th>DIRECTIONS (SIG)</th>
<th>CONTRAINDICATION CAUTION</th>
<th>DRUG INTERACTIONS</th>
<th>ADVERSE REACTIONS</th>
<th>BRAND NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clotrimazole 1% Cream (OTC)</td>
<td>Imidazole Antifungal, Mild to Moderate Cutaneous Candidiasis, Acute Angular Cheilitis</td>
<td>1 tube 15 gm 30 gm</td>
<td>Apply to clean dry affected area 4x/day for 2-4 weeks</td>
<td>None</td>
<td>No significant interactions known or found.</td>
<td>Irritation Erythema Burning Stinging</td>
<td>Various Generic Manufacturers</td>
</tr>
<tr>
<td>Miconazole 2% Cream (OTC)</td>
<td>Imidazole Antifungal, Mild to Moderate Cutaneous Candidiasis, Acute Angular Cheilitis</td>
<td>1 tube 15 gm 30 gm</td>
<td>Apply to clean dry affected area 2x/day for 2-4 weeks</td>
<td>None</td>
<td>No significant interactions known or found.</td>
<td>Irritation Erythema Burning Stinging</td>
<td>Various Generic Manufacturers</td>
</tr>
<tr>
<td>Ketoconazole 2% Cream; contains Sulfites (RX)</td>
<td>Imidazole Antifungal, Mild to Moderate Cutaneous Candidiasis, Acute Angular Cheilitis</td>
<td>1 tube 15 gm 30 gm</td>
<td>Apply 1x/day to affected and adjacent area. Treat for at least 2 weeks</td>
<td>Asthma</td>
<td>No significant interactions known or found.</td>
<td>Irritation Pruritus Stinging Allergic Reaction</td>
<td>Nizoral®, Various Generic Manufacturers</td>
</tr>
<tr>
<td>Nystatin Cream or Ointment 100,000 U/1mL (gm) (RX)</td>
<td>Polyene Antifungal, Cutaneous or Mucocutaneous Candidiasis, Acute Angular Cheilitis</td>
<td>1 tube 15 gm 30 gm</td>
<td>Apply liberally to corners of mouth or apply to the denture base before insertion 4x/day for 2-4 weeks</td>
<td>None</td>
<td>Patients must remove dentures to allow medication to contact mucosa.</td>
<td>Irritation (rare)</td>
<td>Mycostatin®</td>
</tr>
<tr>
<td>Triamcinolone Acetonide 0.1%, Nystatin 100,000 U/1mL (gm) Ointment or Cream (RX)</td>
<td>Steroid + Polyene, Antifungal Mild to Moderate Cutaneous Candidiasis, Chronic Angular Cheilitis</td>
<td>1 tube ointment 15 gm Cream 15 gm 30 gm 60 gm</td>
<td>Apply sparingly 2x/day Maximum 25 days treatment</td>
<td>Varicella Avoid prolonged use + large areas. Ointment: high/medium strength corticosteroid potency Cream: medium strength corticosteroid potency</td>
<td>No significant interactions known or found.</td>
<td>Burning Itching Irritation</td>
<td>Various Generic Manufacturers Mycolog II® Discontinued in US</td>
</tr>
<tr>
<td>Betamethasone as Dipropionate 0.05%, Clotrimazole 1% Cream (RX)</td>
<td>Steroid + Imidazole, Antifungal Mild to Moderate Cutaneous Candidiasis, Chronic Angular Cheilitis</td>
<td>1 tube 15 gm 45 gm</td>
<td>Apply sparingly 2x/day</td>
<td>Varicella Do not occlude. 45 gm per week maximum; Cream: medium strength corticosteroid potency</td>
<td>No significant interactions known or found.</td>
<td>Anthralin Topical Combination may increase symptoms of psoriasis</td>
<td>Skin Atrophy Hypopigmentation Irritation Burning Paresthesia</td>
</tr>
<tr>
<td>Hydrocortisone 1%, Iodoquinol 1%; Cream (RX)</td>
<td>Steroid + Antifungal + Antibacterial, Short-term, Steroid-responsive skin infection with mild bacterial or fungal infection, Chronic Angular Cheilitis</td>
<td>1 tube 30 gm</td>
<td>Apply to affected area 3-4 x/day</td>
<td>Steroid + Antibiotic. Low strength corticosteroid potency</td>
<td>Sabril (vigabatrin)</td>
<td>Burning Itching Irritation</td>
<td>Vytone®</td>
</tr>
<tr>
<td>ANTIFUNGAL AGENT</td>
<td>INDICATION</td>
<td>DISPENSE (DISP)</td>
<td>DIRECTIONS (SIG)</td>
<td>CONTRAINDICATION CAUTION</td>
<td>DRUG INTERACTIONS</td>
<td>ADVERSE REACTIONS</td>
<td>BRAND NAME</td>
</tr>
<tr>
<td>------------------</td>
<td>------------</td>
<td>----------------</td>
<td>-----------------</td>
<td>--------------------------</td>
<td>-----------------</td>
<td>-----------------</td>
<td>------------</td>
</tr>
<tr>
<td>Miconazole Buccal Tablet 50 mg (RX)</td>
<td>Imidazole Antifungal</td>
<td>Buccal Tablets 14 count</td>
<td>1 tab daily in the morning for 14 days. Do not crush, chew or swallow.</td>
<td>Apply the tablet directly maxillary gingiva into the small depression above incisor. Tab will slowly dissolve during the day.</td>
<td>Warfarin, Monitor INR, Combination may increase risk of bleeding disturbance.</td>
<td>Local irritation, Nausea, Diarrhea, Taste</td>
<td>Oravig™</td>
</tr>
<tr>
<td>Nystatin Lozenge (Pastilles) 200,000 U/1mL (gm) (RX)</td>
<td>Polyene Antifungal, Mild to Moderate Oropharyngeal Candidiasis</td>
<td>Pastilles 70 count 14 day supply</td>
<td>1 pastille 4-5x/day for 14 days. Continue for at least 2 days after all symptoms have gone. Slowly dissolve in mouth; do not crush, chew or swallow whole.</td>
<td>Anised licorice flavored. Patients must remove dentures to allow medication to contact mucosa. Requires adequate saliva to dissolve. Contains Sucrose + Glucose. Caution: Diabetes Mellitus patients. Cariogenic so adjunctive topical fluoride therapy may be needed. Do not eat for 30 min after use.</td>
<td>No significant interactions known or found.</td>
<td>May cause mucosal irritation, Nausea</td>
<td>Mycostatin® Pastilles</td>
</tr>
<tr>
<td>Nystatin Vaginal Tablet 100,000 U/1mL (gm) (RX)</td>
<td>Polyene Antifungal, Mild to Moderate Oropharyngeal Candidiasis</td>
<td>Tablet 70 count 14 day supply</td>
<td>1 tablet 4-5x/day for 14 days. Continue for at least 2 days after all symptoms have gone. Slowly dissolve in mouth; do not crush, chew or swallow whole.</td>
<td>Patients must remove dentures to allow medication to contact mucosa. For use with Caries active Patients, Diabetes Mellitus patients</td>
<td>No significant interactions known or found.</td>
<td>May cause mucosal irritation, Nausea</td>
<td>Mycostatin® Tablet</td>
</tr>
<tr>
<td>Clotrimazole Troches 10 mg (RX)</td>
<td>Imidazole Prophylaxis + Treatment of Mild to Moderate Oropharyngeal Candidiasis</td>
<td>Troches 70 count 14 day supply</td>
<td>Treatment: 1 troche 5x/day for 14 days. Prophylaxis: 1 troche 3x/day Slowly dissolve in mouth; do not crush, chew or swallow whole.</td>
<td>Requires adequate saliva to dissolve. Contains Dextrose. Caution: Diabetes Mellitus patients. Cariogenic so adjunctive topical fluoride therapy may be needed. Do not eat for 30 min after use.</td>
<td>No significant interactions known or found.</td>
<td>Vomiting, Nausea May cause altered taste</td>
<td>Various Generic Manufacturers Mycelex® Discontinued in US</td>
</tr>
<tr>
<td>Clotrimazole Vaginal Tablet 100 mg (RX)</td>
<td>Imidazole Prophylaxis + Treatment of Mild to Moderate Oropharyngeal Candidiasis</td>
<td>Tablet to be cut in half 2x/day for 14 days. One-half slowly dissolve in mouth; do not crush, chew or swallow whole.</td>
<td>Requires adequate saliva to dissolve. Patients must remove dentures to allow medication to contact mucosa. For use with Caries active Patients, Diabetes Mellitus patients.</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Nystatin Oral Suspension 100,000 U/1mL (gm) (RX)</td>
<td>Polyene Antifungal, Mild to Moderate Oropharyngeal Candidiasis</td>
<td>60 mL with dropper, 473 mL (1 pint) bottle Swish 1 tsp or 5 mL in mouth, hold 5 minutes 4x/day, or 1 tsp or 5 mL on gauze pad, hold in mouth for 5 minutes 4x/day</td>
<td>Shake well before using. Patients must remove dentures to allow medication to contact mucosa. Contains Sucrose + Glucose. Caution: Diabetes Mellitus patients. Cariogenic so adjunctive topical fluoride therapy may be needed. Do not eat for 30 min after use.</td>
<td>No significant interactions known or found.</td>
<td>Vomiting, Nausea Abdominal pain</td>
<td>Mycostatin® Suspension</td>
<td></td>
</tr>
<tr>
<td>Nystatin Topical Powder 100,000 U/1mL (gm) (RX)</td>
<td>Polyene Antifungal, Denture Stomatitis</td>
<td>15 gm Apply thin film to the denture base after meals before insertion 4x/day for 2-4 weeks</td>
<td>None</td>
<td>Patients must remove dentures to allow medication to contact mucosa.</td>
<td>No significant interactions known or found.</td>
<td>Irritation (rare)</td>
<td>Mycostatin®</td>
</tr>
<tr>
<td>ANTIFUNGAL AGENT</td>
<td>INDICATION</td>
<td>DISPENSE (DISP)</td>
<td>DIRECTIONS (SIG)</td>
<td>CONTRAINDICATION CAUTION</td>
<td>DRUG INTERACTIONS</td>
<td>ADVERSE REACTIONS</td>
<td>BRAND NAME</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>-----------------------------------</td>
<td>-----------------</td>
<td>------------------</td>
<td>--------------------------</td>
<td>------------------------------------------</td>
<td>-------------------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>Fluconazole Tablets 100 mg</strong></td>
<td>-</td>
<td>15 Tablets</td>
<td>2 tablets loading dose then 1, 100 mg/day tablet with food for 7-14 days</td>
<td>Documented hypersensitivity. Monitor liver function.</td>
<td>Hydrochlorothiazide, Warfarin, Phenytoin, Cyclosporine, Zidovudine, Theophylline, Tacrolimus, Cisapride, Erythromycin</td>
<td>Photosensitivity, Nausea, Vomiting, Diarrhea, Allergic Reactions</td>
<td>Diflucan®</td>
</tr>
<tr>
<td><strong>Fluconazole Solution 10 mg/mL</strong></td>
<td>-</td>
<td>350 mg per bottle 1400 mg per bottle</td>
<td>10 mL 1x/day</td>
<td>Documented hypersensitivity. Monitor liver function.</td>
<td>Hydrochlorothiazide, Rifampin, Phenytoin, Cyclosporine, Zidovudine, Theophylline, Tacrolimus, Cisapride, Erythromycin</td>
<td>Photosensitivity, Nausea, Vomiting, Diarrhea, Allergic Reactions</td>
<td>Diflucan®</td>
</tr>
<tr>
<td><strong>Itraconazole Capsules 100 mg</strong></td>
<td>-</td>
<td>15 Capsules 30 Capsules</td>
<td>1 capsule 100 mg/day with food. Tablet with food for 15 days. Increase dose to 200 mg/day for 15 days in AIDS patients if impaired absorption.</td>
<td>Documented hypersensitivity. Monitor liver function. Antacids may reduce absorption of itraconazole. Pregnancy + congestive heart failure contraindicated.</td>
<td>Astemizole, Bepridil, Cisapride, Dofetilide, Levacetylmethadol, Mizonalstine, Pimozide, Quinidine, Sertindole, Terfenadine, Ergot alkaloids, Triazolam, Eletriptan, Nisolidine</td>
<td>Nausea, Vomiting, Stomach Upset</td>
<td>Sporanox®</td>
</tr>
<tr>
<td><strong>Itraconazole Solution 10 mg/mL</strong></td>
<td>-</td>
<td>150 mL 10 mL measuring cup</td>
<td>Swish 100 mg, 1 measuring cup, in mouth for 20 seconds 1x/day for 7 days. Take without food; refrain from eating for at least 1 hour after use.</td>
<td>Documented hypersensitivity. Monitor liver function. Antacids may reduce absorption of itraconazole. Pregnancy + congestive heart failure contraindicated.</td>
<td>Astemizole, Bepridil, Cisapride, Dofetilide, Levacetylmethadol, Mizonalstine, Pimozide, Quinidine, Sertindole, Terfenadine, Ergot alkaloids, Triazolam, Eletriptan, Nisolidine</td>
<td>Headache, Abdominal pain, Vomiting, Nausea, Diarrhea, Dysgeusia</td>
<td>Sporanox®</td>
</tr>
<tr>
<td><strong>Ketoconazole Tablets 200 mg</strong></td>
<td>-</td>
<td>15 Tablets</td>
<td>2 tablets Loading dose then 1, 200 mg/day tablet with food or fruit juice for 7-14 days</td>
<td>Documented hypersensitivity. Monitor liver function. Absorption of Ketoconazole is dependant on gastric acidity.</td>
<td>Triazolam, Terfenadine, Astemizole, Cisapride, Cyclosporine, Tacrolimus, Methyl-prednisolone, Rifampin</td>
<td>Nausea, Vomiting, Diarrhea, Edema, Hypokalemia</td>
<td>Nizora® Generic Manufacturers</td>
</tr>
<tr>
<td><strong>Posaconazole Suspension 100 mg/2.5 mL</strong></td>
<td>-</td>
<td>4-ounce (123 mL) A measured dosing spoon is provided, marked for doses of 2.5 mL and 5 mL.</td>
<td>2 tsp daily Loading dose of 100 mg (2.5 mL) twice a day on the first day, then 100 mg (2.5 mL) once a day for 13 days.</td>
<td>Shake well before use.</td>
<td>Ergot alkaloids, Terfenadine, Astemizole, Cisapride, Pimozide, Halofantrine, Quinidine, Cimetidine, Rifabutin, Phenytoin, Efavirenz</td>
<td>Nausea, Vomiting, Diarrhea</td>
<td>Noxafil®</td>
</tr>
</tbody>
</table>
References


DIRECTIONS: Referring to the module text, please select the BEST answer by circling your response directly on this test. To obtain education credit, a minimum of 70% of the questions must be answered correctly. This learning activity is awarded 1.0 contact hour until June 30, 2011.

1. Since HAART therapy was introduced, the overall incidence of oral lesions has increased.
   A. True
   B. False

2. Oral lesions associated with HIV disease have traditionally been classified by the following:
   A. Etiology
   B. Degree of immune suppression
   C. Intensity
   D. Clinical features
   E. All of the above

3. Candida albicans is a normal component of the oral flora.
   A. True
   B. False

4. Oral candidiasis may be:
   A. An indicator of HIV infection
   B. Found when CD4 is high
   C. Found when viral load is low
   D. Diagnosed only with certain laboratory tests

5. Patients should not take antacids within 2 hours of systemic oral azole therapy.
   A. True
   B. False

6. Candidiasis can be treated with:
   A. Topical therapy
   B. Systemic therapy
   C. Antibiotics
   D. All of the above
   E. A and B

7. There are no standardized treatment guidelines for the treatment of HPV.
   A. True
   B. False

8. Treatment for HPV lesions includes all of the below except:
   A. Desiccation of the lesion(s)
   B. Caustic or acid agents
   C. Intraleisional bleomycin
   D. Antifungal therapy
   E. Cryosurgery

9. Xerostomia can be a side effect of:
   A. Over-the-counter medications
   B. Smoking
   C. Prescription medications
   D. Alcohol consumption
   E. Dehydration
   F. All of the above

10. Reduced salivary flow can lead to a decrease in tooth decay.
    A. True
    B. False

(OVER)
To assure your receipt of education credit, please mail your completed self assessment test, program evaluation/reader information form and HRSA participant information form. (3 pages) to: Jim Ybarra
Albany Medical College
47 New Scotland Avenue, Mail Code 158
Albany, NY 12208

EVALUATION

1. Please select the type of education credit you are seeking:
   □ CME* (proceed to question 3)
   □ Dental Credit (go to question 2)

   *By selecting CME, you will receive a CME certificate. Disciplines with other continuing education requirements (e.g. nurses etc.) are encouraged to submit this CME certificate as evidence of participation for reciprocity of credits.

2. If you are a member of the American Dental Association (ADA), please cite your ADA number here for education credit tracking: ____________________________
   If you do not have an ADA number, please check here** □
   **You are still eligible for dental credit, but will need to submit your dental attendance certificate to your credentialing board for credit.

3. Please rate the feature article with respect to:
   EDUCATIONAL VALUE (circle one) 5 4 3 2 1
   CLARITY (circle one) 5 4 3 2 1
   (5 = excellent 4 = very good 3 = good 2 = fair 1 = poor)
   Comments: ____________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________

4. Did this resource meet its stated learning objectives?
   □ Yes  □ No

5. Do you think that this resource will help you in your work?
   □ Yes  □ No  Why/why not: ____________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________

6. What future HIV topics should this resource address?
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________

7. Did you notice any commercial bias in this resource?
   □ Yes  □ No
   I completed the above activity and am claiming _____ (hour) of credit (number of hours you actually participated). If you completed the entire activity, please write 1.0 hour in the space provided.
   Signature: ____________________________________________

READER INFORMATION FORM

Please print legibly as all information is needed for education credit processing

Name (first and last): ____________________________________________

Degree (i.e. MD, PA, NP, RN, DDS, RDH, etc.): ______________________

Organization Name: ____________________________________________

Organization Address: ____________________________________________

E-mail Address: ____________________________________________

PLEASE PROCEED TO THE NEXT PAGE AND COMPLETE THE HRSA PARTICIPANT INFORMATION FORM.

CME CREDIT/CERTIFICATE QUESTIONS:
Contact Jim Ybarra at 518.262.4674 or ybarraj@mail.amc.edu

DENTAL CREDIT/CERTIFICATE QUESTIONS:
Contact Howard Lavigne at 315.477-8479 or hel01@health.state.ny.us

Please allow 6-8 weeks for your attendance certificate.
**HRSA AIDS Education and Training Centers**

**PARTICIPANT INFORMATION FORM**

To create your unique ID number, use the month of your birth, the day of your birth, and the last four digits of your social security number. For example, May 29, 123-45-6789 has the ID number 05296789.

**Unique ID Number**

<table>
<thead>
<tr>
<th>Month</th>
<th>Day</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>-</td>
</tr>
</tbody>
</table>

**Today's Date**

<table>
<thead>
<tr>
<th>Month</th>
<th>Day</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please completely fill in the circles (○) when answering the questions.

### 3. Your Primary Profession/Discipline (Select one)
- ○ Dentist
- ○ Other Dental Professional
- ○ Advanced Practice Nurse
- ○ Nurse
- ○ Pharmacist
- ○ Physician
- ○ Physician Assistant
- ○ Clergy/Faith-Based Professional
- ○ Dietitian/Nutritionist
- ○ Health Educator
- ○ Mental/Behavioral Health Professional
- ○ Other Public Health Professional
- ○ Social Worker
- ○ Substance Abuse Professional
- ○ Community Health Worker
- ○ Other Non-Professional (specify): ____________

### 4. Your Primary Functional Role (Select one)
- ○ Administrator
- ○ Agency Board Member
- ○ Care Provider/Clinician
- ○ Case Manager
- ○ Client/Patient Educator
- ○ Clinical/Medical Assistant
- ○ Intern/Resident
- ○ Research/Evaluator
- ○ Student/Graduate Student
- ○ Teacher/Faculty
- ○ Other (specify): ____________

### 5. Your Principal Employment Setting (Select one)
- ○ Academic Health Center
- ○ Community Health Center
- ○ Family Planning Clinic
- ○ HIV Clinic
- ○ HMO/Managed Care Organization
- ○ Hospital-Based Clinic
- ○ Hospita/ER
- ○ Indian Health Services/Tribal Clinic
- ○ Infectious Disease Clinic
- ○ Long-Term Nursing Facility
- ○ Maternal/Child Health Clinic
- ○ Mental/Behavioral Health Clinic
- ○ Rural Health Clinic
- ○ Sexually Transmitted Disease Clinic
- ○ Substance Abuse Treatment Center
- ○ College/University
- ○ Community-Based Organization
- ○ Community/Retail Pharmacy
- ○ Correctional Facility
- ○ Military/VA
- ○ Private Practice
- ○ State/Local Health Department
- ○ Non-Health
- ○ Other Primary Care
- ○ Not Working (skip to Q. #9)

### 6. Primary Employment Setting
- ○ Rural
- ○ Suburban/Urban

### 6b. Zip Code

### 7. Is the employment setting a faith-based organization?
- ○ Yes
- ○ No
- ○ Don't Know

### 8. Does the employment setting receive Ryan White Program Funding?
- ○ Yes (skip to Q. 9)
- ○ No (skip to Q. 9)
- ○ Don't Know (go to Q. 10)

### 8b. If 8a=Don't Know, please write the full name of your agency:

### 9. Are you Hispanic, Latino/a, or Spanish origin?
- ○ Yes
- ○ No

### 10. What is your racial background? (Select all that apply)
- American Indian or Alaska Native
- Asian
- Black or African American
- Native Hawaiian or Other Pacific Islander
- White

### 11. What is your gender?
- ○ Female
- ○ Male
- ○ Transgender

### 12a. Do you provide services directly to clients/patients?
- ○ Yes
- ○ No [Stop here. You are done with this form.]

### 12b. Please estimate the PERCENTAGE of your OVERALL CLIENT/PATIENT population in the past YEAR who were racial-ethnic minorities:

- 1-24%/yr.
- 25-49%/yr.
- 50-74%/yr.
- ≥ 75%/yr.

---

**For Office Use Only**

<table>
<thead>
<tr>
<th>July 2010</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>AETC</td>
<td>LPS</td>
</tr>
</tbody>
</table>

**Program ID**

**Agency**

- ○ Yes
- ○ No

---

**Ryan White Program**

39473