

## Review Article

# HIV and Dental Treatment

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**Abstract**

Approximately 1.1 million people are living with HIV, but 17 to 25 percent of these infected individuals are unaware of their disease status and as a result are not getting appropriate medical treatment. Many of those who are untreated need dental care for caries, periodontal disease, and other oral pathologies. Although HIV positive individuals undergoing medical treatment pose a significantly reduced risk for disease transmission, given the numbers of untreated HIV infected, providers of dental care must continue to be vigilant with respect to their preventative infection control measures. This article presents information on the epidemiology of HIV-infected patients and practical clinical considerations that need to be utilized when treating the AIDS patient.

**OVERVIEW**

According to the Morbidity and Mortality Weekly Report (*MMWR*) [1] and other reports (<http://www.cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-report-us.pdf>) there were over 1.1 million adults and adolescents infected with HIV in the United States and individuals newly infected per year ranged from 48,200 to 64,500 persons. Also reported is a disproportionate burden of the disease within racial and ethnic minorities, except for individuals who define themselves as Asians. These statistics also indicate that gay and bisexual men of all races are the ones most affected by HIV infection [2]. Although the incidence of HIV infection does not appear to be increasing, Dental personnel need to be aware that of the 1.1 million people living with HIV, approximately one individual in six is thought to be unaware that they have the infection and as a result are not getting treatment. These individuals, if they need oral care, can potentially spread the disease in the dental setting [3].

Even though the above statistics are distressing, additional *MMWR* statistics from a recent 2014 study [4] are encouraging in that they reveal that of those patients knowing they are HIV infected, most (88.7%) are taking prescribed antiretroviral therapy (HAART) and as a result 71.6% demonstrate a virtually undetectable viral load when tested (<200 copies/mL). Further, of those self-identifying themselves as sexually active, many have also been assessed for other diseases such as syphilis, gonorrhea, and Chlamydia. Less encouraging, however, are the findings of another study assessing behaviors among injecting drug users where 70% of men and 73% of women report having unprotected vaginal sex and lesser numbers (25% and 21% respectively) unprotected anal sex. Further, many subjects in this latter study had not been checked for Hepatitis C. These statistics underscore the importance of effective infection control in the dental setting, particularly in practices located where there may be IV drug [5] use.

Another statistic is of significance in relation to dental health.

In the 2014 *MMWR* survey cited above assessing behavioral and clinical characteristics of persons receiving medical care for HIV infection it was found that 22.8% of patients had unmet dental care needs. And in another HIV Cost and Services Utilization Study (HCSUS) conducted by the RAND Corporation, an even much higher 58 percent of the interviewed participants indicated that they did not receive regular dental care [6]. Research suggests that barriers to the pursuit of dental care in the HIV-infected patient include educational level (lack of a college education), not having dental insurance, ethnicity (being African American), and "how HIV was contracted" (e.g. as a consequence of blood transfusion). Discrimination by dental health care providers is another factor that has been identified as a barrier to appropriate care of the HIV patient [7].

The above *MMWR* and other reports suggest that HIV patients being treated with antiretroviral therapy pose a limited risk to dental personnel but a substantial number of individuals with HIV remain untreated via HAART and thus pose a risk to dental staff and other patients. They also suggest that there is a significant unmet dental need in the HIV-infected community with barriers to treatment both patient as well as practitioner dependant.

**DENTAL INTERVENTION OF THE HIV PATIENT**

Several published references are available to guide dental health care providers in the development of general office procedures relating to the treatment of HIV-infected (and other potentially infective) patients [8-11]. Dental personnel involved in treating HIV-infected patients should be well aware of the current literature and evidence based science that has accumulated since 1983, when AIDS first came upon the scene. Some important highlights from the literature include the following:

1. With the development of antiviral drug strategies, AIDS is now a chronic disease. Highly active antiretroviral therapy (HAART) has significantly reduced deaths and people with HIV can survive more than 20 years with the

disease. This means that more HIV-infected individuals are likely to present for dental treatment over time [12].

2. One in five (20%) of HIV-infected persons do not know that they are infected [12].
3. With the exception of a well publicized case of an HIV-infected Florida dentist who exposed patients to HIV and several other isolated anecdotes [13] the number of reports documenting practitioner to patient spread of HIV come from care delivered outside the USA. It is reported that thousands of patient records reviewed for 75 HIV-infected dentists and physicians have not identified a single problem with HIV transmission of practitioner to patient [14] in the USA.
4. Exposure to blood borne pathogens is significantly reduced via the use of personal protective equipment (PPE) during dental treatment but the use of PPE does not prevent all possible exposures (i.e. needle sticks); hence proper needle technique and disposal remains extremely important.
5. Cross contamination from one HIV patient to another can occur via contaminated instruments or equipment surfaces.
6. Systematic literature review indicates that at this time it cannot be said with reasonable certainty that HIV patients are at a greater risk for the development of treatment complications following invasive dental treatments such as orthognathic surgery, periodontal therapy, dental implants, prophylaxis, scaling, or endodontic therapy (in comparison with non-HIV patients) [15].
7. The Americans with Disabilities Act (ADA), enacted in 1990, designated HIV-infected people, even if they are asymptomatic, as handicapped, and as such patients with HIV are protected by law against discrimination, including that which might occur in a dental office, for example, by refusal of treatment. Unfortunately a lack of education regarding the disease has been found to lead five percent of dentists in one US city surveyed to refuse treatment to HIV patients, in violation of law [16]. The risk of suit may be greater than the risk of disease transmission.

## CLINICAL CONSIDERATIONS IN TREATING THE HIV-INFECTED PATIENT

### Risk management

Risk management includes the development and implementation of office procedures for identification of possible HIV-infected individuals, protective measures to prevent cross infection of HIV from patient to staff, staff to patient, and patient to patient, reporting of exposures should they occur, and referral for additional medical care and counseling of a suspected HIV-infected patient in accordance with the most current United States Public Health Services (USPHS) recommendations. Every dental office should have available to staff a comprehensive written program for preventing and managing occupational exposures to blood and other potentially infectious agents and a designated compliance officer (typically an assistant or hygienist) that

provides regular updates of the current science and procedural regulations related to HIV (and other viral pathogens that can be transmitted through dental care).

### Infection control

Infection control includes identification of potential risk based on patient history, protection of personnel via barrier techniques, instrument and treatment room sterilization, and decontamination of laboratory materials (e.g. models, impressions, etc.). In general, every patient should be considered as a possible transmitter of disease and treated the same in terms of infection control procedures.

### Patient history related to risk

There are certain factors within the medical history that can indicate greater risk of HIV or other contagious infection. Unfortunately, in the dental setting, some of the questions necessary to get at information related to risk of infection with HIV are difficult for clinicians and staff to pose to patients. Nonetheless, while these important pertinent questions may not be asked of patients, they should be appreciated. Historical factors which are associated with increased HIV (and some other infectious diseases such as Hepatitis C) risk include: men having sex with men, more than one sex partner – particularly if one of them injects drugs, use of and sharing of needles, syringes, cookers or other equipment used to inject drugs, and recent infection with another sexually transmitted disease.

Other less personally invasive questions that can be more easily asked of a patient in the dental setting to access for possible HIV (via verbal history or questionnaire) include the presence of symptoms indicating illness such as fever, weight loss, shortness of breath or diarrhea, the occurrence of frequent fungal or yeast infections, liver infection (e.g. hepatitis), frequent recurrent cold sores or oral herpes or other sexually transmitted diseases, prior blood transfusion, and whether the patient is caring for an HIV patient who has hemophilia [17].

### Laboratory and screening tests

If HIV infection is suspected it is best to refer the patient for medical evaluation and laboratory assessment where appropriate screening tests can occur. The standard recommended CDC screening test for HIV infection is the *EIA* or enzyme immunoassay which evaluates the presence of HIV antibodies. This test is performed on a blood draw which is a procedure not typically provided in the dental setting. Two tests are required to confirm a positive diagnosis. Other tests include the evaluation of oral fluid (not saliva) collected by a special collection device and evaluation of urine with the latter less sensitive and less specific than the saliva test. In addition to the above, a home collection test kit has been developed for patients suspecting HIV [18].

### Barrier techniques

In 1993, to facilitate infection control and reduce risk of transmission of infection (generally and not necessarily related to HIV), the CDC published specific infection control criteria for treating dental patients [19]. These recommended procedures and subsequent modifications (in 2003) [20] are now incorporated into many State dental practice acts and have

become the standard of care in the management of all patients and not just those with infectious disease. The cited document (above) can be used to develop a manual on infection control for office use. A PDF e-book has also been released outlining current recommendations [21]. Some of the many recommended procedures include the following.

### For protective attire and barrier techniques

1. Latex or vinyl gloves must be used when there is potential for contacting blood, blood-contaminated saliva, or mucous membranes (although not stated - gloves should be worn for all procedures and for all patients). Non-sterile gloves can be used for examinations and other nonsurgical procedures; sterile gloves should be used for surgical procedures.
2. Hand washing needs to occur before placement of gloves and before placement of new gloves between patients. Old gloves need to be discarded. Washing or attempts at disinfection or sterilization of previously worn gloves is not approved as these efforts are ineffective, will destroy the integrity of the gloves, and can easily cause cross-contamination.
3. Chin-length plastic face shields or surgical masks and protective eyewear need to be worn to protect the eyes from splatter during dental treatment. Masks need to be replaced between patients and during patient care if they become wet or moist. Face shields/eyewear should be washed with an appropriate cleaning agent and disinfected between patients.
4. Protective reusable or disposable gowns, laboratory coats, or uniforms must be worn when treating patients. These items should be removed prior to exiting the treatment area and before initiation of laboratory or other non-treatment patient-care activities. It is recommended that reusable protective clothing be washed using a normal laundry cycle and changed daily if visibly dirty.
5. Impervious-baked paper, aluminum foil, or plastic covers should be placed on light handles or x-ray unit heads and other equipment where cleaning and disinfection is problematic. These materials should be removed, discarded, and replaced between patients (after the removal of contaminated gloves and hand washing).
6. Rubber dams, high-velocity air evacuation, and proper patient positioning is recommended to reduce the formation of salivary particles and aerosols during treatment.
7. Splash shields need to be used in the dental laboratory.

### For sharp instrument and needle management

1. Potentially infective needles, scalpel blades, wires, and other sharp instruments must be handled very carefully.
2. A one-handed 'scoop' technique or a mechanical device designed for holding the needle sheath during recapping is the recommended approach for recapping (all needles need to be recapped after use or when replacing on the

operative tray or prior to disposal). Syringes and needles, scalpel blades, and other sharp items must be placed in puncture-resistant containers for later disposal (there are several companies that provide containers and pick up services). Needles should not be bent or broken prior to disposal.

### For sterilization or disinfection of dental instruments

1. EPA-registered hospital disinfectant with tuberculocidal activity (intermediate-level disinfectant) is recommended.
2. It is important to pay attention to the category of items needing disinfection: those in the critical category are ones that penetrate soft tissue, contact bone, enter into or contact blood; semicritical items contact mucous membranes or non-intact skin but do not contact bone or blood; and noncritical items are ones that contact intact skin. The latter includes, for example, the radiograph head/cone, blood pressure cuff, face bow or other hardware used in restorative care, and the pulse oximeter.
3. Each dental office should have a designated central processing area divided into sections for receiving, cleaning and decontamination, preparation and packaging, sterilization, and storage.
4. Heat-tolerant dental instruments must be sterilized by autoclaving, dry heat, or unsaturated chemical vapor. For heat-sensitive critical and semi-critical instruments and devices, liquid chemical germicides registered by the FDA as sterilants can be used. Liquid chemical sterilants are highly toxic and must be handled carefully.
5. The dental office should establish and use some type of monitoring system (a simple pad or software program) to make sure that the sterilization equipment is effective.
6. Manufacturer's instructions need to be followed for the cleaning and sterilization of hand pieces; and after operative use the dental hand piece should be run for a minimum of 20-30 seconds to clear the water lines.
7. Appropriate barriers should be used on dental components that are permanently attached to dental units such as saliva ejectors, high-speed evacuators, and the air/water syringe followed by disinfection with an EPA-registered disinfectant (intermediate-level).

### Dental unit water quality

1. Each dental office should develop a strategy for the cleaning and disinfection of blood spills, medical waste disposal, and utilization of state-approved treatment technologies for containing blood and saliva discharge into the sewer system.
2. To reduce the possibility of virus and other microorganisms contaminating treatment water within dental hand pieces, ultrasonic scales, or air/water syringes, these items should be discharged for 20-30 seconds after each patient's visit and before next use (even if a device is equipped with an antiretraction valve).

3. It is important to consider water quality monitoring.
4. Sterile solution systems should be used to cool and irrigate during oral surgical procedures (including implants). Other delivery devices that can be considered to deliver sterile solution include bulb syringes or other single-use disposable products.

### Infection control related to laboratory supplies and materials and biopsy specimens

1. It is important to disinfect materials that will be sent to a laboratory. These include impression materials, models, appliances, and other materials that have been potentially contaminated by blood or saliva. Disinfection begins with thorough removal of blood and saliva.
2. An EPA-registered hospital germicide labeled with antimyobacteria (tuberculocidal) activity (defined as an intermediate-level disinfectant) is recommended for use on laboratory supplies and materials.
3. Materials returned from the dental laboratory need to be cleaned and disinfected prior to placement in the patient's mouth.
4. The dental office must communicate with the dental laboratory instructions regarding handling of contaminated materials [11].
5. Biopsy specimens need to be handled with care. When placing a specimen for transfer to pathology it is important to make sure that the outer surface area of the container is not contaminated. If contamination is suspected, the container needs to be disinfected prior to mailing or transfer.

The 2003 guidelines also provide additional sterilization information on a variety of topics such as the handling of extracted teeth, laser/electrosurgery plumes or surgical smoke, and dental radiology. Additional infection-control internet resources are also provided in the document. The Organization for Safety and Asepsis Procedures ([osap.org](http://osap.org)) has also published a good reference source describing CDC guidelines [22].

## OTHER CLINICAL CONSIDERATIONS

### Needle placement

If needles are to be used repeatedly they should be recapped and placed in a sterile area on the instrument tray. Techniques for recapping have been previously described.

### Syringe systems designed to reduce needle stick injury

To reduce needle stick exposure associated with conventional syringes several manufacturers have marketed devices designed to automatically cap the needle post-use. Many of these 'safety' dental syringes have been removed from the market because of user dissatisfaction (and at least one study suggesting they may be no safer than traditional needles [23]) but several are still available. They include the Ultra safety Plus XL Syringe (Septodont, Lancaster, PA, USA), the Ultrasafe Syringe (Safety Syringes Inc, Carlsbad, CA, USA), the HypoSafety

Syringe (Dentsply MPL Technologies, Susqueanna, PA, USA), the SafetyWand (Milestone Scientific Inc, Livingston, NJ, USA) which is touted as the first injection device to be fully compliant with OSA regulations under the federal Needlestick Safety Act, and the RevVac safety syringe. Few of these devices have been subjected to stringent study related to purported prevention efficacy but they might be considered if there is concern regarding needle stick injury.

### Sharps injury and HIV exposure

Sharps injuries and other forms of exposure can occur during dental treatment and if the patient is known to be HIV-infected, appropriate post exposure management is critical. The CDC has published information on their web site [24]: <http://www.cdc.gov/niosh/topics/bbp/emergnedl.html>.

It is suggested that post needle stick the affected area should be immediately washed with soap and water; splashes to the nose, mouth (with contact with mucosa), or skin should be flushed with water; the eyes should be irrigated with clean water, saline, or sterile irrigating solutions post exposure by fluids. Any exposure incident should be immediately reported and medical treatment should be quickly pursued (within one to two hours). Even given exposure by percutaneous needle stick, the risk of contracting AIDS is small (estimated from a number of studies to be in the range of 0.32%) [25,26]. Mixed risk results are reported for mucous membrane exposure with one source indicating an estimated risk of .09% [27] and another less than .03% [28].

Reported factors that increase the risk of HIV infection following exposure include: deep penetrating injury, visible blood on the injury device, injury from a needle placed in a patient's artery or vein, and inoculation by a terminal HIV-related patient not on therapy or with a very high viral load [29].

It is important to note that the risk of infection by needle exposure from an untreated HIV-infected patient is low to begin with [30] and if the patient is on HAART and has minimal HIV virus at the time of the needle stick injury it may be essentially nonexistent. Further, it should be appreciated that pure saliva not contaminated by blood has not been implicated in the transmission of HIV [31]. The virus, however, has been isolated from subgingival biofilm [32] in HIV-infected patients. Hence, to be on the safe side the above precautions should be used in case of any type of exposure involving contact with oral fluids.

### Managing dental Apprehension in the HIV patient

Fear of dental procedures including injections and subsequent numbness is common in both healthy [33] and HIV infected patients. But HIV infected patients experience other fears related to dental care not typically encountered by healthy patients. In a qualitative study assessing HIV-related stigma in the dental setting [34], 45 percent of 60 HIV-infected individuals interviewed indicated that they anticipated judgment, stigmatization, or disrespectful treatment in the dental office because of their HIV status. Thirty-five percent endorsed a fear of the dentist and an equal number concerns about confidentiality and receiving humane treatment. Some were concerned with giving HIV to the dentist. The authors of this study conclude that dental "providers should be aware of and better manage these issues".

Management of dental fear may require counseling, sedation, and sometimes cognitive behavioral psychology. Several strategies related to local anesthesia and oral sedation may be helpful in managing the fearful patient. These include the use of vibration injection syringes, the use of lidocaine and prilocaine dental gel to produce a profound topical anesthesia during deep scaling and root planning, and the use of the sedative/anxiolytics for sedation [35]. Articaine hydrochloride has also been recommended if repeated injections are anticipated but recent research suggests that there are toxicity issues (paresthesia) associated with this anesthetic [36] so it should be used with caution.

## SUMMARY

Dental patients have an expectation that appropriate infection control measures will be taken by their dental health care providers. The primary concerns identified in one study relate to the possible transmission of infectious diseases such as HIV (as well as hepatitis B, hepatitis C, and tuberculosis). It is expected that dental personnel will wear masks, gloves, and glasses [37], but as indicated in this written article, CDC and ADA guidelines extend far beyond these simple measures; and it is recommended that these more extensive measures be implemented in clinical practice. While clinical personnel should take comfort in knowing that in the age of HAART – patients receiving HIV treatment pose little risk of exposure to other patients or staff. But precautions still need to be taken to prevent exposure from those patients not knowing that they are HIV-infected (and not receiving HAART). Given the risk of infectious disease transmission in general all dental patients should be treated using the recommended CDC infection control guidelines. This article discusses important clinical considerations helpful in managing the dental needs of HIV-infected patients.

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