

**Original article:**

## **Dental care towards HIV/AIDS – an overview**

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### **Abstract**

Dentists can often detect early manifestations of systemic diseases in the oral cavity and may function as gatekeepers in the healthcare system by referring patients to physicians and nurse practitioners for evaluation and treatment. However, when it comes to treating subjects with infectious diseases particularly those attached with social stigma like HIV/AIDS, there remains doubts and hesitation. Oral health considerations for persons infected with HIV focus on the provisions of adequate dental care. The use of effective infection control procedures and universal precautions in the dental office and dental laboratory will prevent cross-contamination that could extend to dentists, dental office staff, dental technicians and patients. This article summarises key points in care of HIV/ AIDS patients which may be easily incorporated in routine dental practice.

**Keywords:** HIV infection, universal precautions, dental office

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### **Introduction**

Infection prevention and control is an important part of safe patient care. Concerns about the possible spread of blood-borne diseases, and the impact of emerging, highly contagious respiratory and other illnesses, require practitioners to establish, evaluate, continually update and monitor their infection prevention and control strategies and protocols. The increased awareness of infectious diseases and the recognition of the potential for transmission of numerous infectious microorganisms during dental procedures has led to an increased concern for, and attention to infection control in dental practice. This renaissance of infection control during the last few years would seem to have been stimulated by the increasing prevalence of acquired immunodeficiency syndrome (AIDS).<sup>[1]</sup> Human immunodeficiency virus (HIV) infection and acquired immunodeficiency syndrome (AIDS) are phenomena which have been a part of world's

experience since 1981 and are considered global pandemic with cases reported from virtually every country.<sup>[2]</sup> Due to the advances and accessibility of anti-retroviral therapy, HIV/AIDS is no longer considered an immediate death sentence, and is now being viewed in the wealthier developed countries as a chronic illness.<sup>[3]</sup> However, both a cure and effective vaccines remain elusive, and the successes of anti-retroviral therapy have also led to complacency, particularly among populations who are at risk of acquiring the disease.<sup>[2]</sup> A pressing problem in the developed countries lies in the fact that, although people with HIV are living longer, the number of new infections has not been reduced. Joint United Nations program on HIV/AIDS (UNAIDS) in 2008, reported an estimate number of adults living with HIV as 31 million worldwide with 2.71 million people living in Indian subcontinent alone.<sup>[4]</sup>

Oral health considerations for persons infected with HIV focus on the provisions of adequate

dental care. The virus establishes itself within lymphoid tissue, where it replicates and becomes available to the immune system.<sup>[5]</sup> The particular immunodeficiency in HIV disease is attributed to CD4+ lymphocyte depletion, enabling the development of specific opportunistic infection that is associated with a high degree of morbidity and mortality.

The role of dental services in reducing the incidence of HIV is largely ignored in the dental literature. We being dentist, should remember that people with HIV are important partners in prevention; The virus can be transmitted only through them. If they feel abandoned by care services, they are less likely to understand the need for prevention and to be motivated to protect others.<sup>[6]</sup> This is important in social intervention approaches to HIV prevention, to avoid discrimination against people infected with HIV. The following section provides a brief summary of the dental care for the people living with HIV/AIDS.

#### **Principles of Infection Prevention and Control (IPAC)**

IPAC principles include:

- Patient assessment;
- Following routine practices;
- Using barrier techniques to protect both patients and “oral health care worker” (OHCW);
- Applying the principles of cleaning, disinfection, sterilization and storage of dental instruments;
- Environmental cleaning;
- Care of the overall office setting;
- Safe handling and disposal of wastes.

#### **Personal Protective Equipment**

- General considerations
- Gloves

- Protective eyewear
- Masks
- Protective clothing

#### **General consideration**

“Mouth is the mirror of the health” so it is that the Dental Surgeons have a very important role to play, in the early diagnosis of HIV / AIDS by picking up the early oral clinical manifestation .The ever growing presence of HIV infection necessitates that dental professionals should have the knowledge about HIV/AIDS as it relates to the Masks provision of dental care. It is mandatory for every dental surgeon to know about the specific oral lesions to arrive at the diagnosis and do the needful.

**Mask:** Dental health-care personnel should wear a surgical mask that covers both their nose and mouth during procedures and patient-care activities that are likely to generate splashes or sprays of blood or body fluids. A surgical mask protects the patient against microorganisms generated by the wearer and also protects dental health care personnel from large-particle droplet spatter that may contain blood borne pathogens or other infectious microorganisms. When a surgical mask is used, it should be changed between patients or during patient treatment if it becomes wet.<sup>[7]</sup>

**Eyewear:** Dental health care personnel should wear protective eyewear with solid side shields or a face shield during procedures and patient-care activities likely to generate splashes or sprays of blood or body fluids. Protective eyewear protects the mucous membranes of the eyes from contact with microorganisms. Protective eyewear for patients also can protect their eyes from spatter or debris generated during dental procedures. Reusable protective eyewear should be cleaned with soap and water, and when visibly soiled, disinfected between patients.<sup>[8]</sup>

**Clothes:** Various types of protective clothing (e.g., gowns, jackets) are worn to prevent contamination

of street clothing and to protect the skin of personnel from exposure to blood and body fluids. When the gown is worn as personal protective equipment (i.e., when spatter and spray of blood, saliva, or other potentially infectious material is anticipated), the sleeves should be long enough to protect the forearms. Protective clothing should be changed daily or sooner if visibly soiled. Personnel should remove protective clothing before leaving the work area.<sup>[8]</sup>

**Gloves:** Dental health care personnel wear gloves to prevent contamination of their hands when touching mucous membranes, blood, saliva, or other potentially infectious materials and to reduce the likelihood that microorganisms on their hands will be transmitted to patients during dental patient-care procedures.<sup>[8]</sup>

**Minimizing Droplet Splatter:** By their very nature, the provision of dental services can involve the creation of droplets, spatter and spray contaminated with blood, saliva, other body fluids and debris. As previously noted, rubber dam should be used whenever feasible, and high-volume suction should be used whenever the creation of droplets, spatter and spray is possible.

**Exposure Management:** Blood-borne pathogens, such as HBV, HCV and HIV, can be transmitted to OHCWs through occupational exposures to blood, saliva and other body fluids. Significant exposures must be handled in a prompt and organized fashion. For this reason, an exposure management protocol is an important component of an in-office Infection Prevention and Control Manual.

#### **Equipment and Area Specific Practice Guidelines**

- Dental Unit Waterlines
- Dental Handpieces and Other Intraoral Devices
- Saliva Ejectors
- Single-Use Devices

- Dental Radiography Equipment
- Digital Radiography Sensors and Intraoral Cameras
- Lasers and Electrosurgery Equipment
- Dental Laboratory Asepsis
- Handling of Biopsy Specimens

#### **Dental unit waterlines:**

Dental unit waterlines must be maintained regularly to deliver water of an optimal microbiologic quality. Although infection associated with microbial contamination of waterlines appears to be rare, it has been shown that the level of microorganisms in untreated dental unit waterlines is greater than 500 CFU/mL, which exceeds the drinking water standard. Colonization of microorganisms within the waterlines-while it may not be a concern to healthy individuals-might place elderly or immunocompromised patients at unnecessary risk. Dental unit waterlines (the tubes that connect the high-speed handpiece, air/water syringe and ultrasonic scaler to the water supply) have been shown to harbor, in significant numbers, a wide variety of microorganisms including bacteria, fungi, and protozoans. These microorganisms colonize and replicate on the interior surfaces of the waterline tubing, inevitably resulting in adherent heterogeneous microbial accumulations termed "biofilms". Biofilms, once formed, serve as a reservoir significantly amplifying the numbers of free-floating microorganisms in the water exiting the waterlines. It has been suggested that heating dental unit water to increase patient comfort, as is the practice in some dental offices, may further augment biofilm formation. In dental unit waterline systems that are not maintained, these microbial accumulations can contribute to occasional objectionable odors and visible particles of biofilm material exiting the system.<sup>[9]</sup>

#### **Dental handpieces and other intraoral devices:**

Routine sterilization of handpieces between patients is desirable; however, not all handpieces can be sterilized. The present physical configurations of most handpieces do not readily lend them to high-level disinfection of both external and internal surfaces; therefore, when using handpieces that cannot be sterilized, the following cleaning and disinfection procedures should be completed between each patient: After use, the handpiece should be flushed, then thoroughly scrubbed with a detergent and water to remove adherent material. It should then be thoroughly wiped with absorbent material saturated with a chemical germicide that is registered with the EPA as a "hospital disinfectant" and is mycobactericidal at use-dilution.<sup>[10]</sup> The disinfecting solution should remain in contact with the handpiece for a time specified by the disinfectant's manufacturer. Ultrasonic scalers and air/water syringes should be treated in a similar manner between patients. Following disinfection, any chemical residue should be removed by rinsing with sterile water.

Because water retraction valves within the dental units may aspirate infective materials back into the handpiece and water line, check valves should be installed to reduce the risk of transfer of infective material.<sup>[11]</sup> While the magnitude of this risk is not known, it is prudent for water-cooled handpieces to be run and to discharge water into a sink or container for 20-30 seconds after completing care on each patient. This is intended to physically flush out patient material that may have been aspirated into the handpiece or water line. Additionally, there is some evidence that overnight bacterial accumulation can be significantly reduced by allowing water-cooled handpieces to run and to discharge water into a sink or container for several minutes at the beginning of the clinic day.<sup>[12]</sup> Sterile saline or sterile water should be used as a

coolant/irrigator when performing surgical procedures involving the cutting of soft tissue or bone.

#### **Saliva ejectors:**

Studies have not been reported adverse health effects associated with the saliva ejector. But research from nearly two decades has shown that there is risk involved. Dental health-care personnel should be aware that backflow might occur when they use a saliva ejector, especially when the tubing is above the patient's head<sup>[13]</sup>.

A few simple things you can do to prevent cross-contamination from a saliva ejector:

- Do not advise patients to close their lips tightly around the tip of the saliva ejector to evacuate oral fluids.
- Never position the suction tubing above the patient. Always have it hang below the patient's head.
- Suction lines should be disinfected between patients.
- Dental health care professionals should contact the manufacturer of the dental unit to review proper use and maintenance procedures, including appropriate disinfection methods.
- Many companies have come up with products to prevent backflow, including saliva ejectors with prevention built in, or anti-backflow prevention devices for the dental unit. It is important to investigate all preventive tools.
- Saliva ejectors are single-use items and must be disposed of after a single use.
- Do not use low volume and high volume suction simultaneously.

#### **Single-use devices:**

The facts emphasize the need for immediate and decisive action to prevent the unsafe re-use of injection devices. A safe injection should not harm

the patient, expose the health-care worker to any avoidable risks, or result in waste that is dangerous to the community. The widespread publication and distribution of solutions to address this global problem is urgently required to reduce the risk to patients due to poor medical care<sup>[14]</sup>.

**Dental radiography equipment:**

To prevent the spread of infectious diseases, the dental assistant must ensure that appropriate disposable barriers are placed to protect splash surfaces likely to be contaminated during the course of patient treatment, especially those difficult to disinfect.

Protective barriers consist of plastic sleeves over dental tubings and covers on dental light handles, light switches, patient chairs, and X-ray machine tubeheads. These must be discarded after the patient has been dismissed and replaced before seating the next patient. As long as the barrier stays intact, the contaminated covering can simply be removed and replaced at the end of the clinic day or following any contact between the surface and exposure to blood or other potentially infectious materials, the dental assistant must apply appropriate precleaning and disinfection procedure<sup>[15]</sup>.

**Laser:**

The primary responsibility of a perioperative nurse during a laser procedure is keeping the patient safe. Safety hazards are inherent with laser usage but adherence to proper procedures lowers injury risks. When preoperative nurses receive education in laser science and safety they can recognize potential hazards and help ensure adherence to safety parameters. Class 3b and 4 laser exposures usually occur from unintentional operation or when users fail to follow proper controls. The high electrical energy to generate the beam is a potential shock hazard. Direct beam exposure can burn skin and eyes possibly resulting blindness.

Electric shock and fire also pose potential hazards when using lasers. Primary worker protection measures include using effective of direct or diffuse beam viewing. These lasers may ignite combustible materials and thus may represent a fire risk. Class 4 lasers must be equipped with a key switch and a safety interlock. Most entertainment, industrial, scientific, military and medical lasers are in this category<sup>[16]</sup>.

**Dental laboratory asepsis:**

The use of appropriate infection control precautions is important for dental laboratory technicians, as it is for the dental team. Improper handling of contaminated items, such as impressions, casts, and other prosthetic appliances, can result in cross-contamination and possible cross-infection to personnel. When used together, routine use of recommended infection control procedures and protocols, along with effective communication between the dental practice and the dental laboratory, can provide a safe working environment for those with potential occupational risks.

The first step in any infection control procedure is cleaning. With regard to dental laboratories, impressions may be cleaned by scrubbing gently and rinsing to reduce bioburden, and subsequently disinfected with an antimicrobial agent.<sup>[17]</sup> Dental impressions may be disinfected by spraying, dipping, or immersing. The advantages of the spray method are that less of the disinfectant product is used, and often the same product may be used to disinfect environmental surfaces. The spray method also releases chemicals into the air, increasing the potential for occupational exposures. The dipping or immersion technique requires complete coverage of the impression in the disinfectant. Shorter exposure times minimize possible distortion and deterioration of the surface quality of the resulting stone casts. However, the

manufacturer's instructions should always be consulted for their recommended procedures.

#### **Handling of biopsy specimens:**

Biopsy is a useful technique for definitive diagnosis of abnormal oral conditions and it must be performed carefully since any error may result in histopathologic misidentification of the lesion. The principal aim of obtaining a biopsy is to provide a specimen for histopathologic diagnosis of lesions.<sup>[17]</sup> Obtaining biopsies in general dental office has several advantages for patients. Considering the rapport between the patient and the dentist, the patient will have a better feeling. In addition, the patient will cut down on the number of commutes and will spend less time waiting for the biopsy to be taken and for receiving its report. On the other hand, fewer patients will be referred to specially centers.<sup>[19]</sup> Based on suggestions made by Oliver, biopsies permissible for general dentists have been listed. Fibroepithelial polyp, pyogenic granuloma and epulis are lesions which can undergo biopsy techniques by general dental practitioners. In relation to mucoceles, if care is exercised, they can be biopsied. Highly experienced dentists can biopsy mucosal lichen planus. However, general dental practitioners should refrain from taking biopsies from chronic ulcers, squamous cell carcinomas and small and large salivary gland tumors and should immediately refer the patient to a hospital. Patients with leukoplakia, erythroplakia, blistering lesions, such as pemphigus, and granulomatous diseases, too, should be referred to a hospital.<sup>[20]</sup>

#### **Care for impressions:**

In prosthodontics, disinfection of impression trays, bowls, spatulas, impressions, wax bites, occlusal rims, stone models and prostheses is a crucial aspect of universal precautions for infection control. Prevention of contaminated dental impressions and other dental items leaving the

immediate chair side area is an ideal way to control cross-contamination. Casts can be treated by immersing the casts or spraying them with disinfecting solutions.<sup>[22]</sup> Current recommendations advocate the use of disinfecting solutions such as formaldehyde, chlorine compounds, gluteraldehyde, iodofor, and phenolic compounds in adequate concentrations.<sup>[22]</sup> Ragwheels can be washed and autoclaved after use in each patient. Brushes and other equipment should be disinfected at least daily.

#### **Precaution during surgical therapy:**

Many patients with HIV infection may require preprosthetic surgeries for successful removal partial or complete dentures. These procedures can safely be carried out in HIV-positive individuals as most studies indicate no difference in the post-operative complications such as delayed healing, infection or prolonged bleeding when compared to healthy individuals. Further, studies have suggested that variations in viral load, CD4 cell count or antiretroviral medication regiments do not impact surgical healing.<sup>[23, 24]</sup> Campo et al.<sup>[25]</sup> studied the risk of oral complications after invasive and non-invasive dental procedures in HIV subjects and concluded that presence of oral lesions, smoking habit or HIV clinical stage B may be predictive factors for oral complications in HIV patients.

#### **Waste disposal:**

Disposable materials such as gloves, masks, wipes, paper drapes and surface covers that are contaminated with body fluids should be carefully handled with gloved hands and discarded in study, impervious plastic bags to minimize human contact. Blood, disinfectants and sterilants can be carefully poured into a drain connected to a sanitary sewer system. Sharp items, such as needles and scalpel blades, should be placed in puncture-resistant containers marked with the biohazard label.<sup>[26]</sup> An HIV patient is prone to many

opportunistic infections such as fungal lesions (candidiasis, histoplasmosis and Cryptococcus neoformans); viral lesions (Herpes zoster, Herpes simplex, Human papilloma virus, Cytomegalovirus, hairy leukoplakia, and Epstein-Bar virus); bacterial lesions (periodontal lesion and mycobacterium); neoplastic lesion (Kaposi's sarcoma and lymphoma) and other lesions (oral ulceration, thrombocytopenic purpura and salivary gland disease).

#### **Conclusion:**

Dental management of HIV infected subjects is made easy by following comprehensive primary oral health care. Oral health should be an integral part of primary health care for all patients with HIV/AIDS. Asymptomatic HIV-infected patients and clinically stable, HIV/ AIDS patients should receive routine, comprehensive oral health care in the same manner as all other patients. The provision of care should be coordinated between medical and oral health care providers.

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