Infection control

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More than 20 years ago, a dental patient named Kimberly Bergalis was diagnosed with Aids. The source of her HIV infection was her dentist. Even though the exact path of transmission is still not known, this first proven transmission of HIV from dentist to patient—and the subsequent intense coverage by the media—set off tremendous confusion and panic amongst dental patients. It was her unfortunate death in 1991 that changed the dental profession almost overnight, prompting all sorts of new regulations and guidelines, including the sterilisation of dental instruments. The document *Guidelines for Infection Control in Dental Health-care Settings* was published by the US Centers for Disease Control and Prevention (CDC) on 19 December 2003, providing some of the current and available scientific rationale for infection-control practices, for which recommendations were made.[1] These suggestions were followed closely by various governing dental health organisations, including the US Occupational Safety and Health Administration (OSHA) and Health Canada.

In dentistry, we see patients from different walks of life every day and they bring all kinds of pathogens to our dental offices. It is our responsibility to arrest the path of these pathogens and attempt to prevent them from infecting others and spreading beyond our practices. Following the CDC recommended infection-control guidelines and procedures can help stop and prevent transmission of infectious organisms through blood, oral and respiratory secretions and contaminated equipment during the course of dental treatment. One factor to consider in assessing the risk of contamination is the type of bodily substances to which dental health-care personnel (DHCP) are exposed. It is generally understood that human blood has a high infectious potential.[2] In addition to bacteria and fungi, human saliva has been found to be capable of harbouring many kinds of infectious viruses.[3,4] Without the benefits of a quick and reliable reference, DHCP have to assume that everyone is a potential carrier. This is the fundamental reason that dental practices should have a universal infection prevention protocol.

Amongst many other related issues, the CDC guidelines explain the manner in which to wear surgical gloves properly and implement a glove protocol. These recommendations will help properly prevent contamination from our patients' oral tissues and fluids. Regarding surgical masks, laser ablation of human tissue or dental restorations can cause thermal destruction and can create smoke by-products containing dead and live cellular material (including blood fragments), viruses, and possible toxic gases and vapours. One concern is that aerosolised infectious material in the laser plume, such as the herpes simplex virus and human papillomavirus may come into contact with the nasal mucosa of the laser operator and nearby DHCP. Although no evidence exists that HIV or the hepatitis B virus (HBV) has been transmitted via aerosolisation and inhalation, there are scientific studies that confirm the risk of this possible route of contamination.[5,6] The risk to DHCP from exposure to laser plumes and smoke is real, and, along with other measures such as strong high-volume suction, the use of a high-filtration mask is strongly recommended (Fig. 1).

Fig. 1_An example of a high-filtration protective mask, which is recommended for use with dental lasers.
Fig. 2_An example of the submission of indicators to a testing service for assessment of office sterilisation equipment's effectiveness.

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Sterilisation is a multistep procedure that must be performed carefully and correctly by the DHCP to help ensure that all instruments are uniformly sterilised and safe for patient use. Cleaning, which is the first basic step in all decontamination and sterilisation processes, involves the physical removal of debris and reduces the number of micro-organisms on an instrument or device. If visible debris or organic matter is not removed, it can interfere with the disinfection or sterilisation process. Proper monitoring of sterilisation procedures should include a combination of process indicators and biological indicators, and should be assessed at least once a week (Fig. 2). Patient-care items are generally divided into three groups, depending on their intended use and the potential risk of disease transmission. Critical items are those that penetrate soft tissue, touch bone or contact the bloodstream. They pose the highest risk of transmitting infection and should be heat sterilised between patient uses. Examples of critical items are surgical instruments, periodontal scalers, surgical dental burs, optical fibres (Fig. 3) and contact tips (Fig. 4). Therefore, it is extremely important to examine, cleave, polish and sterilise optical fibres and contact tips after each use. Alternatively, sterile, single-use, disposable devices can be used. Semi-critical items are those that come into contact with only mucous membranes and do not penetrate soft tissues. As such, they have a lower risk of transmission. Examples of semi-critical instruments are dental mouth mirrors, amalgam condensers and impression trays. Most of the equipment in this category is heat tolerant, and should therefore be heat sterilised between patient uses. For heat-sensitive instruments, high-level disinfection is appropriate. Non-critical items are instruments and devices that come into contact only with intact (unbroken) skin, which serves as an effective barrier to micro-organisms. These items carry such a low risk of transmitting infections that they usually only require cleaning and low-level disinfection. Examples of instruments in this category include X-ray head/cones, blood pressure cuffs, low-level laser emission devices and laser safety glasses. For low-level laser therapy, the use of a transparent barrier similar to disposable sleeves for curing lights is acceptable. For safety glasses, the use of a low-level disinfectant is suitable as long as it has a label claim approved by OSHA for removing HIV and HBV. The disposal of used instruments and excised biological tissues should be managed separately. A cleaved optical fibre, broken contact tips, or disposable fibres should be disposed of properly in a sharps container. Harvested biological waste should be placed in a container labelled with a biohazard symbol. In order to protect the individuals handling and transporting biopsy specimens, each specimen must be placed in a sturdy, leak-proof container with a secure lid to prevent leakage during transport. By following these guidelines, the spread of pathogens amongst dental patients, DHCP and their families can be prevented, and the passing of Kimberly Bergalis will not have been in vain._

Fig. 3_An example of sterilised optical fibres and handpieces.
Fig. 4_An example of sterilised rigid glass tips and handpieces.

Disclosure

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