AN OVERVIEW OF
INFECTION PREVENTION
IN THE DENTAL OFFICE

By Fiona M. Collins, BDS, MBA, MA, FPFA
Infection prevention is a key activity in the dental office, essential to prevent the transmission of microorganisms and disease among patients and dental healthcare personnel. It must be performed in a reliable and effective manner in accordance with current recommendations to ensure patient safety, and in accordance with regulations that protect the safety and health of dental healthcare personnel. Infection prevention protocols that are effective, reliable, and standardized promote health and safe dental visits.

Dr. Fiona M. Collins, BDS, MBA, MA, FPFA

Dr. Collins has lectured nationally and internationally in North America, Europe, the Pacific Rim, and the Middle East and has written extensively on infection prevention. Fiona is the ADA representative to the Association for the Advancement of Medical Instrumentation (AAMI) and a member of working groups for Standards on steam sterilization and other aspects of infection control. She is a Fellow of the Pierre Fauchard Academy and editor of Dental World, the CE Editor for Dental Learning, and has been a faculty member at the Organization for Safety, Asepsis and Prevention (OSAP) Boot Camp. During her career, she has lived and worked in five countries. Dr. Collins received honoraria from KaVo Kerr, the sponsors of this course. She previously received an honorarium for this course from Dental Learning. Dr. Collins can be reached at fionacollins@comcast.net.

The goal of this course is to provide a general overview of infection prevention in the dental setting. After completing this course, the reader should be able to:

1. Define modes of transmission in the dental setting.
2. Describe appropriate hand hygiene and the use of personal protective equipment during patient care and other activities.
3. Review the management of clinical contact surfaces.
4. List and describe steps in instrument reprocessing.

Introduction

Infection prevention is a key activity in the dental office, essential for the health and safety of patients and dental healthcare personnel (DHCP), and thereby the community at large. The "Guidelines for Infection Control in Dental Healthcare Settings—2003" provides recommendations for infection control from the Centers for Disease Control and Prevention (CDC). A summary of key points from these was published by the CDC in 2016. Education and training, and compliance with infection control protocols is necessary for the success of programs. The Occupational Safety and Health Administration (OSHA) has requirements...
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with respect to relevant Standards, for example, the Bloodborne Pathogens Standard. It is recommended that all offices have an infection control coordinator who has overall responsibility for infection control in the office and for training. In addition, using checklists and self-audits serves to help confirm that procedures are being properly followed and to identify areas where improvements are required.

The objective of infection control protocols is to break the chain of infection, elements of which include the presence of pathogens at a level sufficient to cause disease, a source/reservoir for pathogens, an exit portal from the source/reservoir with a mode of transmission to an entry portal in a host, and host susceptibility. Potential sources/reservoirs include patients, healthcare personnel, and contaminated inanimate objects. Transmission occurs through direct contact with blood or other potentially infectious materials (OPIM); contact of oral, nasal, or ocular mucous membranes with contaminated aerosol, splatter, or droplets; inhalation of airborne or aerosolized microorganisms; or indirect contact with a contaminated inanimate object. Host susceptibility depends on an individual’s health and vaccination status. CDC recommendations on immunization for healthcare workers are based on Association for Professionals in Infection Control and Epidemiology (APIC) and Healthcare Infection Control Practices Advisory Committee (HICPAC) recommendations. State laws on immunization must also be checked. Further, all DHCP at occupational risk of exposure to bloodborne pathogens must be educated on bloodborne pathogens and offered the Hepatitis B vaccine (at no charge) within 10 days of assignment by their employer. If an individual refuses vaccination, he/she must sign the Hepatitis B declination form. Records of the vaccination status of DHCP must be maintained.

The following sections provide a general overview of specific protocols for infection prevention in the dental setting. Additional information on each aspect of infection prevention can be found in the referenced sources.

Hand Hygiene

Hand hygiene should be performed prior to donning and after removing gloves, when changing out gloves, following ungloved contact with a patient’s skin and/or potentially contaminated inanimate objects, when hands are visibly soiled, and when leaving the operatory/laboratory. For routine procedures, hand hygiene should be performed with plain or antimicrobial soap if debris is present, and hands should be thoroughly dried using a single-use disposable paper towel. If no debris is present, an alcohol-based handrub containing 60% to 95% alcohol OR soap and water can be used (Figure 1). Alcohol-based handrubs do not remove debris. Hand hygiene should be performed in accordance with the instructions for use (IFU) for the product used.

Surgical procedures are more invasive in nature and pose a greater risk of transmission of microorganisms. Therefore, surgical hand antisepsis requires that either an antimicrobial soap with persistent activity is used to scrub hands and forearms, or alternatively, plain soap and water followed by use of a surgical hand scrub with persistent activity. A sterile, single-use disposable towel should be used to dry hands and forearms after using soap and water. Surgical hand antisepsis is intended to remove all transient flora and to reduce resident flora.

Figure 1. Hand hygiene options for routine procedures
Other Considerations

Removing hand and wrist jewelry before performing hand hygiene may enable more thorough hand hygiene; not wearing it does reduce the risk of glove perforation.1,5 Keeping fingernails short, rounded, and smooth makes thorough hand hygiene easier to perform and reduces the risk of glove puncture. Chipped/worn nail polish should be removed, as this can harbor microorganisms.1,6,7 In addition, the CDC recommends that artificial nails not be worn when treating high-risk patients.1 Reasons for noncompliance with hand hygiene include skin irritation, lack of availability of a suitable hand hygiene product, lack of time, and distance to a sink.7,8 Compliance can be aided by using alcohol-based handrubs when possible (i.e., in the absence of debris) as these are less drying to skin than soap and water, by thoroughly drying hands after using soap and water, and by avoiding products that result in allergy-induced dermatitis.1,9 In addition, products that are pleasant to use, as well as glove-compatible skin lotions and barrier creams that reduce skin dryness and improve skin health, can improve compliance.1,10 More information on hand hygiene can be found in the CDC recommendations.1,11

Personal Protective Equipment (PPE)

PPE acts as a barrier between healthcare personnel, and patients and the operatory. For patient care, appropriate protective attire, a single-use disposable surgical face mask, protective eyewear or a face shield, and single-use disposable gloves are recommended as standard PPE.1 For surgical procedures, the gloves must also be sterile.1 If gloves become punctured or torn during patient care, they must be discarded, hand hygiene (or surgical hand antisepsis) performed, and fresh gloves donned.1 When there is risk of exposure to bloodborne pathogens, clinical attire must be long-sleeved and cuffed, closed up to the neck and reach below the knees (or include jackets and pants). For instrument reprocessing and operatory clean-up, heavy-duty utility gloves that are puncture- and chemical-resistant are required.1,12 In addition, liquid-resistant shoe covers, a hair cover, and a water-resistant protective apron/gown may be needed.1,13 Surgical face masks help to protect the wearer from inhalation of airborne and aerosolized microorganisms and particles; they also protect mucous membranes from spray, splash, and spatter. They must fit well and be comfortable, while also offering good breathability, as well as a suitable level of filtration, fluid resistance, and flame resistance. The American Society for Testing and Materials (ASTM) rates surgical face masks based on their filtration efficacy, fluid and flame resistance, and breathability. Mask selection should be based on the level of protection required for a given procedure, i.e., the anticipated level of aerosol, spray, splash, spatter, and particulate material, followed by breathability and comfort.14 A higher-rated mask provides a higher level of filtration and a greater level of protection (Table 1). For individuals with sensitive skin, dye-free and hypoallergenic masks are available. If a mask becomes damp, this renders it ineffective as wicking can occur whereby microorganisms can penetrate the mask. Therefore, a damp/wet mask should always be replaced with a fresh mask. When transmission-based or expanded precautions are required, a fitted National Institute for Occupational Safety and Health (NIOSH)-certified particulate-filter respirator must be used.3,15,16 NIOSH respirators are also recommended when performing laser procedures, due to the risk of exposure to laser plumes.17

Protective eyewear protects the eyes from exposure to microorganisms and debris. American National Standards

<table>
<thead>
<tr>
<th>TABLE 1. ASTM-rated surgical face masks</th>
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<tr>
<td>ID</td>
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<tr>
<td>BFE</td>
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<td>PFE</td>
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<td>Fluid Resistance</td>
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<tr>
<td>Flame Resistance</td>
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<tr>
<td>Breathability (Delta P)</td>
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</tbody>
</table>
Institute (ANSI)-approved protective eyewear that fits snugly over the eyes up to the brow and that includes side shields is recommended, or a face shield may be worn. Face shields provide greater protection, since they cover the whole face. Face shields are not a substitute for surgical face masks, which should still be worn. During patient care, patients also should wear protective glasses.1

Other Considerations for Gloves

Contact allergies and life-threatening anaphylactic shock can occur in individuals sensitive to latex, and allergies can also occur with natural rubber/chemicals in synthetic rubber gloves.18,19 Use of latex gloves must be avoided for healthcare personnel and patients with latex allergies, and alternatives must be available to a DHCP if he/she is allergic to a glove material.20 Further, some chemicals cause degradation of glove materials, in particular latex material.1,21 Oil- and petrolatum-containing products degrade latex. Vinyl, nitrile, and neoprene single-use disposable gloves are effective, available in a variety of sizes, colors, and scented/unscented. Comfort and reduced risk of hand and wrist strain have been observed in individuals using right- and left-handed gloves instead of ambidextrous gloves.22 Emollients and other products used for hand hygiene and skin health must be compatible with glove materials to avoid their degradation.

Managing Environmental Surfaces

Housekeeping surfaces pose little threat of cross-contamination and transmission of microorganisms. Floors should be routinely cleaned with a detergent and water using a single-use disposable mop/cloth or a dry, clean reusable mop/cloth. Other environmental surfaces should be cleaned when visibly dirty/dusty. If a housekeeping surface is visibly contaminated with blood or OPIM, this must promptly be removed and surface disinfection performed.1

Clinical contact surfaces (CCS) can become contaminated through direct/indirect contact, spray, splash, spatter, and aerosols. Further, contamination has been found more than 30 feet from treatment chairs as a result of contaminated aerosols.23 Single-use, FDA-cleared barrier protection can be placed over uncontaminated CCS, such as operatory light handles, headrests and chairs, radiographic equipment, and curing lights (Figure 2). It is particularly useful for surfaces that are difficult to access for cleaning and disinfection. Barrier protection also saves time and reduces the need for chemicals. The underlying surface should be examined after removal of barrier protection. If found to be visibly contaminated, the surface should also be cleaned and disinfected in accordance with recommendations.

Cleaning and disinfecting are required for all exposed CCS. Visible debris must be removed for disinfection to occur as the disinfectant cannot penetrate debris. Disinfection should occur using an EPA-registered intermediate-level hospital disinfectant with a TB kill time, if visible blood/OPIM is present.1 If not present, either a low-level EPA-registered disinfectant with an HIV and HBV claim or an intermediate-level disinfectant may be used.

Cleaning and disinfection can be performed using a one-step process if there is no visible debris, provided the product is labeled as a one-step cleaner-disinfectant and it is EPA-registered.24 The one-step process involves depositing the product on the surface, typically using a spray or pre-impregnated wipe, and leaving the product to dry on the surface for the required kill time. For the two-step process, the same product can be used twice if it is both a cleaner...
and a disinfectant, or a cleaner and then an EPA-registered disinfectant can be used sequentially. The IFU must be followed.1 The two-step process can be either a spray-wipe-spray procedure or a wipe-throw-wipe procedure. After disinfection, the surface must remain wet for the required kill time. If using preimpregnated wipes, check the labeling for the surface area that can be adequately covered using a single wipe and use the number of wipes required to treat the whole surface. Using fewer wipes than recommended can result in the surface drying before the kill time has elapsed.

Considerations in product selection include the kill time, scent, safety profile, user-friendliness, and compatibility with surfaces. If in doubt, contact the manufacturer and request data on compatibility with nonporous materials that would be treated and contact the manufacturer of the surface (e.g., the chair manufacturer for upholstery). At the end of the day, all CCS should be cleaned and disinfected.

**Single-Use Disposables and Waste Streams**

Single-use disposables reduce the risk of cross-contamination and operator error, remove the need to reprocess instruments and save time. Placing single-use and single-dose items on a tray prior to seeing the patient also helps organizationally.

**Disposing of Sharps, Other Single-Use Items, and Waste**

Sharps disposal chairside, prior to transporting instruments and devices to the reprocessing area/room, reduces the risk of percutaneous injuries.25 Disposable scalpels, suture needles, broken glass carpules, capped syringes, orthodontic wire and other sharps must all be placed in a sharps container. The sharps container must be securely closed and sealed once the fill line is reached, and must be disposed of in accordance with all regulations. Nonregulated items such as disposable saliva ejectors, barrier protection, bibs, and air/water syringe tips may be discarded in the general trash chairside or in the instrument reprocessing area, as may unit-dose materials provided they do not fall under the categories of regulated/hazardous waste. Examples of regulated medical waste (that are not sharps) include blood-soaked gauze, cotton rolls, excised tissue, and extracted teeth that do not contain amalgam restorations. Regulated medical waste must be “red bagged” in a leak-proof medical waste container that is labeled/color-coded appropriately, then disposed of. All regulated waste must be segregated and disposed of in accordance with regulations and requirements for the given waste stream.

**Instrument Reprocessing**

Reprocessing of instruments is based on CDC recommendations and Spaulding’s classification (Table 2).1 All critical instruments and heat-resistant semicritical instruments must be cleaned and heat-sterilized.1 Handpieces and attachments require separate consideration, and are discussed later in this article.

<table>
<thead>
<tr>
<th>Critical instruments/devices</th>
<th>Semicritical instruments/devices</th>
<th>Noncritical instruments/devices</th>
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<tr>
<td>Penetrate soft tissues, contact bone, or other normally sterile tissues, or enter into or contact the bloodstream or other normally sterile tissue. Reprocessing: Clean and heat-sterilize.</td>
<td>Contact mucous membranes or nonintact skin. Reprocessing heat-resistant items, handpieces, and attachments*: Clean and heat-sterilize. Reprocessing heat-sensitive items: Clean and immerse in FDA-cleared sterilant/high-level disinfectant.**</td>
<td>Contact intact skin. Reprocessing: Clean and disinfect with an EPA-registered disinfectant. If blood is present, an intermediate-level disinfectant with a TB claim is used.</td>
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*Note that cordless handpieces and attachments are processed in accordance with the validated instructions for use.

**Tests cannot be performed to assure sterility when using sterilant/high-level disinfectant.
General steps in instrument processing of critical and semicritical heat-resistant items include point-of-use cleaning to remove gross debris (if indicated and in accordance with the IFU), transportation, sorting and disassembly (if required), presoaking (if indicated), cleaning, preparation and packaging, heat-sterilization, sterilization monitoring, and storage (Figure 3).

During transportation, contaminated instruments and devices should be contained in a rigid, leak-proof container. Closed, perforated cassettes containing instruments must also be contained to remove the risk of a sharps injury associated with an instrument point emerging through a perforation. The use of these cassettes also reduces the risk of damage to instruments and contributes to safety during instrument processing.26 Closed, perforated cassettes containing instruments can be placed in presoaks and automated/semiautomated cleaning devices, and secure instruments during instrument processing steps. The cassettes with instrument set-ups by procedure also help to organize inventory and save time. On arrival in the instrument reprocessing area/room, instruments are sorted. Hinged instruments should be fully opened and devices should be disassembled if indicated in the IFU. The reprocessing area/room should have a unidirectional flow with instruments received in the contaminated (dirty) area and each sequential step in the workflow leading up to the removal of sterile packages from the clean area to storage. A systematic, sequential work flow reduces the risk of confusion and recontamination of processed items (Figure 4).

Presoaking prevents debris from drying on instruments if a period of time will elapse prior to cleaning.27 It also helps to moisten and loosen dried-on debris, making its subsequent removal during cleaning easier. Make sure that presoaking is indicated for specific instruments and devices by first reading the IFU. Using an enzymatic presoak solution or foam starts to break down bioburden. The solution/foam should completely cover the instruments throughout presoaking. Factors in selecting a presoak include whether it is an enzymatic; how instrument-friendly it is; whether it is a concentrate or ready to use (consider inventory requirements, storage space, risk of spillage, and chemical exposure); ease of use; versatility, and pH.

Options for cleaning include mechanical and manual cleaning. Mechanical cleaning using FDA-cleared instrument washers/washer-disinfectors or ultrasonic cleaners is more effective than manual cleaning, as well as safer.28,29

Figure 3. General steps in instrument reprocessing

Figure 4. “Clean” end of the reprocessing area, signalled with a blue light
Manual cleaning is discouraged and, if possible, should be avoided. If manual cleaning becomes necessary – for example, to remove residual spots of debris present after mechanical cleaning, it should be performed at arm’s length, low in the sink using a long-handled brush, and preferably holding the item with long-handled tongs.

Instrument washers and washer-disinfectors provide for automated cleaning, rinsing in high-quality water, and drying, and involve the least handling of contaminated instruments. Instrument washer-disinfectors include a high-temperature cycle and proprietary formulations that result in reduced microbial contamination. The formulations recommended by the device manufacturer must be used and the IFU followed. Device testing should also be performed in accordance with the IFU.

Ultrasonic cleaning devices are semiautomated. The implosion of bubbles in the ultrasonic cleaning solution against the exposed, accessible surfaces of instruments mechanically cleans these surfaces. Loose instruments should be placed in a designated basket or other container in the ultrasonic cleaner and cassettes loaded in accordance with the IFU. Contaminated items should not be placed in contact with the sides/base of the ultrasonic cleaner, treated in large quantities that would overload the ultrasonic cleaner, or added during its use. The ultrasonic cleaner’s lid should be closed prior to switching the device on, to prevent the release of aerosolized solution. Cleaned instruments must be thoroughly rinsed and dried before proceeding further. Only ultrasonic cleaning solutions should be used, in accordance with the IFU, and may be enzymatic, nonenzymatic, or marketed with other attributes. Ultrasonic solutions should be discarded and replaced at least daily. If bacterial loads are high, the solution should be changed more frequently and should also be replaced if visibly soiled. Ultrasonic solutions should never be topped off. Factors in choosing ultrasonic cleaners include their volume, space requirements, countertop or under-the-counter configuration, power and noise levels, reliability, ease of use, and level of automation (Table 3).

### TABLE 3. Factors in selecting ultrasonic cleaners

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<tr>
<th>• Volume</th>
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<tr>
<td>• Space requirements and configuration</td>
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<td>• Power and noise levels</td>
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<tr>
<td>• Ease of use</td>
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<td>• Level of automation</td>
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<tr>
<td>• Reliability</td>
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<td>• Company support</td>
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Cleaned, dry instruments should be inspected to ensure they are free of damage, defects, and debris. After passing an inspection, instruments should be prepared per the IFU and placed in FDA-cleared sterilization packaging which typically consists of paper/plastic pouches or in the case of closed, perforated cassettes may consist of sterilization wrap that includes an internal indicator and heat-sensitive tape for closure. Loose sharp instruments should not be placed in pouches as they may puncture these. Self-sealing pouches offer ease-of-use. Sterilization packaging must be strong enough and indicated for its intended use, have an adequate seal, allow penetration of the sterilant, and remain intact during subsequent storage.13,30 In addition, chemical indicators (CI) verify whether the package was exposed to parameter(s) for the sterilization cycle and also serve to differentiate processed from unprocessed instruments. The sterilizer used and date/cycle information should be placed on the external surface of the packaging for identification purposes.

All sterilization packaging should include an internal indicator (Type 3, 4, 5, or 6), and if this is not visible, then a Type 1 external indicator should also be used. If an in-use indicator fails, the load should be reprocessed. The Type 2 indicator (Bowie-Dick/air-removal test) is required only for dynamic air removal (Class B) sterilizers and must be used in a test pack at the beginning of each day in an otherwise-empty sterilizer.13 CI indicate only that the process met the parameter(s) being measured, they do not assure sterility. Additional information on CI can be found in the CDC Guidelines (2003) and ST79.1,13
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Heat sterilization is usually achieved in the dental setting by autoclaving. Instrument loads must be placed with sufficient space between them to allow the steam to penetrate the packaging and access all areas of the instruments. Autoclave racks provide for predetermined space between wrapped cassettes and between pouches (Figure 5). Using distilled water prevents spotting and build-up of deposits. Examples of typical cycle times and temperatures for gravity displacement and dynamic air removal autoclaves are, respectively, 15 to 30 minutes at 250°F (121°C) and 3.5 to 10 minutes at 270°F (132°C). This does not include the warm-up, pressurization time, or the time required for depressurization and the drying cycle. When processing instruments, the cycle indicated by the device’s manufacturer should be followed and the IFU of the autoclave manufacturer adhered to. Sterilization packs must only be removed from the autoclave once completely dry, to avoid wicking. After removal from the autoclave, packaged instruments should be stored in their intact sterilization packaging in a dry, dust-free storage area until needed. Intact sterilization packaging maintains the sterility of instruments during storage.¹,¹³

Note also that certain sterilizers use autoclave cassettes. Sterilization monitoring must be performed for each sterilization load. This includes use of the autoclave’s mechanical indicators (MI), which provide immediate feedback on whether the cycle parameters were reached (time, temperature, and pressure). MI are now usually digital, while older autoclaves used analog MI. The Association for the Advancement of Medical Instrumentation (AAMI) recommends that only devices with the capability to provide print-outs be used for autoclaving (either directly or with use of an auxiliary device for print-outs).¹³ Records of MI results must be kept in the sterilization log. CIs should also be used, as discussed earlier. Biological indicators (BI; spore tests) are recommended at least weekly and every time an implantable device is being sterilized.¹ Unlike MI and CI, BI provide for sterility assurance.¹ A test BI is placed inside the sterilizer and a control BI from the same lot is used outside the sterilizer. If the spores are killed in the test BI and not the control BI, sterility assurance is confirmed. BI are available as in-office and third-party mail-in tests. All data must be recorded before BIs are used, including the load number, sterilizer number, and processing date. This data should be placed on the BI label and in the sterilization records along with the results of tests performed. Procedures to follow in the event of a failed spore test can be found in the CDC Guidelines (2003) and AAMI’s ST79 document.¹,¹³

Heat-sterilization in the dental setting may also be performed using dry heat sterilizers or chemclaves.¹ Dry heat sterilizers use higher temperatures than autoclaves, do not result in instrument corrosion and packages do not need to be dried since only dry air is used. However, the higher temperatures used can damage instruments and devices containing plastics and resins (e.g., handpieces). Dry heat sterilizers are therefore contraindicated for sterilizing these.¹,¹³ Chemclaves reduce the risk of instrument corrosion compared to autoclaves.¹ However, they require the use of chemicals which must also be disposed of, and are now infrequently used in the dental setting.

**Handpieces and Attachments**

All handpieces and attachments that attach and detach from the dental unit air and water lines should be cleaned and heat-sterilized. Typical steps for handpiece reprocessing can be found in Figure 6. The precise steps vary by handpiece and attachment. It is crucial to read...
the manufacturer’s instructions for reprocessing and to follow these; failure to do so can result in damage to the device. More information on reprocessing of handpieces and attachments, and the recommendations for cordless handpieces, can be found in the references cited here.\(^{31-33}\)

**Evacuation Lines**

Chemicals used at the end of the day to clean evacuation lines remove deposits and debris, deodorize, and clean these lines. They also help prevent the buildup of deposits, including calcium. Chemicals that may be used for evacuation lines are regulated under the EPA Final Rule.\(^{34}\) Accordingly, evacuation line cleaners must have a pH of between 6 and 8 and those containing oxidizers are prohibited for offices falling under the EPA Final Rule.\(^{34}\) Note that municipal/local regulations may be stricter than EPA requirements, and that it is important to check on permitted chemicals for your area. Further information is available on the EPA website and in articles on amalgam separators.\(^{34-36}\)

**Dental Unit Waterlines (DUWL)**

DUWL are susceptible to biofilm accumulation due to the slow-flowing water against the walls of lengths of narrow lumens and intermittent use of the tubing used to convey water to devices and the cuspidor.\(^1\) This biofilm contains potentially pathogenic microorganisms that can result in the transmission of microorganisms and disease.\(^{1,37}\)

The IFU for the maintenance and control of DUWL from the dental unit manufacturer or the device manufacturer should be reviewed. Purging of DUWL should occur for 20 to 30 seconds at the beginning and end of the day and after treating each patient, to remove patient material that might have been retracted during treatment.\(^1\) A recent white paper from the Organization for Asepsis, Safety and Prevention (OSAP) recommends to test DUWL monthly at first as well as after changing maintenance procedures, then quarterly after several monthly tests have shown that the level of CFU is within recommended levels.\(^{37}\) If the level of contamination exceeds 500 CFU/mL of heterotrophic bacteria, the DUWL should be shocked and retested. Testing may be performed using an in-office test or a laboratory test – the current spread plate R2A agar method or membrane filtration method is recommended for a laboratory test.\(^{37}\) There is no CDC recommendation on the frequency of testing DUWL. Regular DUWL maintenance protocols should be followed, using a standard operating procedure, once the level of heterotrophic bacteria is below the recommended threshold.\(^{37}\) The manufacturers of specific dental unit waterline treatments provide recommendations and protocols for the use of their products.

**Conclusions**

Thorough and safe infection prevention in the dental office is essential to prevent the transmission of microorganisms and disease among patients and dental healthcare personnel. Each step in performing infection control should occur in a reliable and effective manner.
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to break the chain of infection, and must comply with regulations that protect the safety and health of dental healthcare personnel. The CDC also recommends that an infection control coordinator is assigned for each dental setting, whose responsibilities include education and training on infection control.

References
33. Centers for Disease Control and Prevention. Handpieces, FAQ. Available at: https://www.cdc.gov/oralhealth/infectioncontrol/faqs/dentalhandpieces.html.

Webliography
CE Quiz

1. _______ is a responsibility of infection control coordinators, as recommended by the CDC.
   a. Handling of general emergencies
   b. Education and training on infection control
   c. Managing all inventory
   d. Hiring of DHCP

2. CDC recommendations on immunization for healthcare workers are based on __________ recommendations.
   a. AAMI and ASTM
   b. APEX and HICPAC
   c. AAMI and APIC
   d. APIC and HICPAC

3. For routine procedures, hand hygiene may consist of use of an alcohol-based handrub containing _______ alcohol OR soap and water if no debris is present on the hands.
   a. 55% to 85%
   b. 60% to 90%
   c. 60% to 95%
   d. 65% to 90%

4. Surgical hand antisepsis requires that an antimicrobial soap with persistent activity is always used to scrub hands and forearms.
   a. True
   b. False

5. The intent of surgical hand antisepsis is to __________.
   a. remove all transient and resident flora
   b. reduce transient and resident flora
   c. remove all transient flora and reduce resident flora
   d. remove all resident flora

6. The CDC recommends that artificial nails not be worn when treating __________.
   a. patients receiving oral surgery
   b. high-risk patients
   c. all patients
   d. patients who are under 18 years old

7. The wearing of heavy-duty utility gloves that are puncture- and chemical-resistant is _______ during instrument reprocessing.
   a. optional
   b. recommended
   c. required
   d. only required if the user has broken skin on his/her hands

8. The _______ rates surgical face masks based on their filtration efficacy, fluid and flame resistance and breathability.
   a. National Institute for Occupational Safety and Health
   b. American Society for Testing and Materials
   c. Centers for Disease Control and Prevention
   d. United States Food & Drug Administration

9. The process by which microorganisms can penetrate damp packaging is known as _______.
   a. ditching
   b. osmosis
   c. transference
   d. wicking

10. Contamination has been found more than __________ from treatment chairs as a result of contaminated aerosols.
    a. 10 feet
    b. 20 feet
    c. 30 feet
    d. 60 feet

11. Disinfection should occur using an EPA-registered _______ if visible blood/OPIM is present.
    a. low-level hospital disinfectant with a TB kill time
    b. intermediate-level hospital disinfectant with an HIV kill time
    c. intermediate-level hospital disinfectant with a TB kill time
    d. FDA-cleared disinfectant

12. Using fewer wipes than recommended can result in _______.
    a. damage to the surface
    b. the surface drying before the kill time has elapsed
    c. the wipes being destroyed
    d. a and b

13. Sharps disposal chairside, prior to transporting instruments and devices to the reprocessing area/room, _______.
    a. can increase clutter in the operatory
    b. increases the risk of percutaneous injuries
    c. decreases the risk of percutaneous injuries
    d. is required

14. Nonregulated items such as disposable saliva ejectors, barrier protection, and air/water should be ________.
    a. red-bagged for disposal
    b. discarded in the general trash
    c. placed in plastic recycling containers
    d. a and b

15. During transportation, contaminated instruments and devices should be contained in ________.
    a. a rigid, leak-proof container
    b. closed, perforated containers
    c. a sealed container
    d. presoak

16. Using an enzymatic presoak solution or foam _______.
    a. protects instruments from corrosion
    b. protects instruments from dried-on debris
    c. dissolves minerals on the surface
    d. starts to break down bioburden

To complete this quiz online and immediately download your CE verification document, visit www.dentallearning.net/inf-ce, then log in to your account (or register to create an account). Upon completion and passing of the exam, you can immediately download your CE verification document. We accept Visa, Mastercard, Discover, and American Express.
17. The use of ______ involves the least handling of contaminated instruments during cleaning.
   a. a long-handled brush and tongs
   b. an ultrasonic cleaning device
   c. an instrument washer or washer-disinfector
   d. a presoak

18. An ultrasonic cleaner’s lid should be closed prior to switching the device on, so as to ______.
   a. avoid releasing prions
   b. prevent the release of aerosolized solution
   c. improve the device’s efficiency
   d. make it possible to turn the device on

19. Chemical indicators ______.
   a. verify whether the package was exposed to parameter(s) for the sterilization cycle
   b. should be used for each package
   c. differentiate processed from unprocessed instruments
   d. all of the above

20. Mechanical indicators provide ______.
   a. delayed feedback that the cycle parameters were reached
   b. immediate feedback that the cycle parameters were reached
   c. sterility assurance
   d. third-party verification of the cycle

21. The ______ recommends that only devices with the capability to provide print-outs be used for autoclaving (either directly or with use of an auxiliary device for print-outs).
   a. Association for the Advancement of Medical Instrumentation
   b. Centers for Disease Control and Prevention
   c. United States Food & Drug Administration
   d. Environmental Protection Agency

22. Dry heat sterilizers ______.
   a. result in instrument corrosion
   b. result in spotting of instruments
   c. can damage instruments and devices containing plastic and resins
   d. provide greater sterility assurance due to the higher temperature

23. ______ are the only tests that provide sterility assurance.
   a. Biological indicators
   b. Mechanical indicators
   c. Chemical indicators
   d. All of the above

24. All handpieces and attachments that attach and detach from the dental unit air and water lines should be ______.
   a. cleaned and heat-sterilized in an autoclave
   b. cleaned and disinfected
   c. cleaned and sterilized in a dry heat sterilizer
   d. cleaned and immersed in high-level sterilant/disinfectant

25. Handpieces can be presoaked prior to cleaning.
   a. True
   b. False

26. Chemicals used to clean evacuation lines ______.
   a. remove deposits and debris
   b. clean and disinfect the lines
   c. coagulate deposits for ease of removal
   d. should only be used weekly

27. Under the EPA Final Rule, evacuation line cleaners must have a pH of between ______ and those containing ______ are prohibited.
   a. 5 and 7; coagulants
   b. 5 and 7; oxidizers
   c. 6 and 8; oxidizers
   d. 6 and 8; coagulants

28. Purging of DUWL should occur for 20 to 30 seconds ______ to remove patient material that might have been retracted during treatment.
   a. at the beginning and end of the day
   b. after treating each patient
   c. daily
   d. a and b

29. It has recently been recommended that DUWL should be tested monthly at first, as well as after changing maintenance procedures, then ______ after several monthly tests have shown that the level of CFU is within recommended levels.
   a. biweekly
   b. bimonthly
   c. quarterly
   d. semiannually

30. Regular DUWL maintenance protocols should be followed, using a standard operating procedure, once the level of heterotrophic bacteria is below the recommended threshold.
   a. True
   b. False
An Overview of Infection Prevention in the Dental Office

CE ANSWER FORM

Name: ___________________________  Address: ___________________________
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License Renewal Date: ___________

EDUCATIONAL OBJECTIVES
- Define modes of transmission in the dental setting;
- Describe appropriate hand hygiene and the use of personal protective equipment during patient care and other activities;
- Review the management of clinical contact surfaces; and,
- List and describe steps in instrument reprocessing.

COURSE EVALUATION
Please evaluate this course using a scale of 5 to 1, where 5 is excellent and 1 is poor.

1. Clarity of objectives ............................................. 5 [ ] 4 [ ] 3 [ ] 2 [ ] 1 [ ]
2. Usefulness of content ............................................. 5 [ ] 4 [ ] 3 [ ] 2 [ ] 1 [ ]
3. Benefit to your clinical practice ............................... 5 [ ] 4 [ ] 3 [ ] 2 [ ] 1 [ ]
4. Usefulness of the references .................................... 5 [ ] 4 [ ] 3 [ ] 2 [ ] 1 [ ]
5. Quality of written presentation ............................... 5 [ ] 4 [ ] 3 [ ] 2 [ ] 1 [ ]
6. Quality of illustrations .......................................... 5 [ ] 4 [ ] 3 [ ] 2 [ ] 1 [ ]
7. Clarity of quiz questions ........................................ 5 [ ] 4 [ ] 3 [ ] 2 [ ] 1 [ ]
8. Relevance of quiz questions ................................. 5 [ ] 4 [ ] 3 [ ] 2 [ ] 1 [ ]
9. Rate your overall satisfaction with this course ............ 5 [ ] 4 [ ] 3 [ ] 2 [ ] 1 [ ]
10. Did this lesson achieve its educational objectives?  Yes [ ] No [ ]
11. Are there any other topics you would like to see presented in the future? _____________________________________________
12. Overall administration of the program ...................... 5 [ ] 4 [ ] 3 [ ] 2 [ ] 1 [ ]

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