How often have you noticed something that should have been obvious for weeks or months, but went undetected? Perhaps a small handprint low on a hallway; that coupon on the counter you keep meaning to use the next time you go to the specialty store; or any number of things that become so much a part of the daily landscape that eventually you look right past them.

That same phenomenon of selective vision can occur in the workplace. The dental unit is a vital piece of equipment for the dental team, but it is easy to fail to notice when it no longer looks as good as it should or to overlook elements of routine asepsis we associate with the equipment. The next time you are in the treatment room, pause and really look at the dental cart, cabinet and attachments. Is there a little bit of cement or root canal paste on the saliva ejector handle? Maybe the cover on the light has fingerprints, dust, or some water spray marks on the outer surface. Are there surfaces or crevices that are difficult to disinfect and would benefit from the use of barriers during treatment? When is the last time you looked at the underside of an over-the-patient delivery system to ensure there is no contamination on the bottom of the tray? Debris provides an attractive environment for contamination because disinfectants cannot reliably penetrate to disinfect the surfaces below. These are just the things we can see on the surface. Often, it is what we do not see that is the cause for greatest concern.

Viruses, such as hepatitis B that may be present in the blood or saliva from dental patients may survive for a week or more on environmental surfaces. Anyone who has seen If Saliva Were Red (OSAP) has a strong visual image of the contamination that can occur during dental procedures that is virtually undetectable by mere observation. It is unclear the extent to which environmental contamination may contribute to the risk of disease transmission. However, there are attachments and areas of the dental cart that the dental team touches during treatment where the risk for cross contamination is very high. These include handles, control knobs, buttons and switches, among others.

Of all of the things that the dental team uses in connection with patient care, the dental cart and its non-removable parts may be most likely to encounter the patient’s oral tissues and are frequently in contact with the dental team’s gloved hands, making cross contamination a challenge to prevent.

Handpieces and attachments
Current guidelines from the Centers for Disease Control and Prevention (CDC) call for the removal, cleaning and sterilization of all detachable devices such as high- and slow-speed handpieces that contact oral tissues.

Learning Objectives
After reading this article, the reader should be able to:

- identify areas in and around the dental cart that require infection control management.
- determine the appropriate process for cleaning and decontamination of contaminated surfaces and devices.
- design a protocol for decontamination of the dental cart and attachments.
Close-Up on the Dental Unit
continued from front cover

Discard all items labeled as single use or disposable. The remaining devices should consist of items that do not enter the patient’s mouth.

Clean and disinfect hoses, air water syringes and other items such as curing lights that are permanently attached to the unit between patients with a low- (HBV/HIV kill) to intermediate-level (tuberculocidal) disinfec tant (for more information on disinfectants, see the May 2005 and May 2006 issues of Infection Control In Practice (ICIP)), or use fluid impervious barriers. Keep in mind that barriers must fit the devices in order to prevent leakage and require changing after each patient. Disinfect or barrier-protect the holders for air-water syringes and handpieces to prevent cross contamination. Be sure to remove hoses and attachments to gain access to the exterior and interior portions of the holder.

Evacuation system
Filter traps in the evacuation system prevent passage particles of material and oral debris generated during dental treatment. These filters become full over time, reducing the ability of the vacuum pump to evacuate fluids and other debris. Change traps before they become so full that they place a strain on the vacuum pump or before they cause the system to fail to function at the desired level. Use disposable traps rather than attempting to clean and reuse trap filters to avoid unnecessary contact with tissue and other potentially infectious material. With the vacuum off, remove the disposable trap and place it in the palm of a gloved hand. While removing the glove, turn it inside out to contain the trap. Follow local regulations for the disposal of mixed hazardous waste since the trap may contain both medical waste (e.g., tissue) and hazardous waste (e.g., amalgam).

Water
Devices that use water for irrigation and cooling are subject to biofilm formation in the water-lines or directly from the water supply. For routine non-surgical dental procedures, output water should meet the Environmental Protection Agency (EPA) standards for drinking water, which is no more than 500 cfu/mL of heterotrophic water bacteria. In order to achieve this standard the dental team must institute a treatment and maintenance protocol for the water lines and/or water supply bottles. Effective treatment depends upon both the product performance and the proper application of protocols by the dental office personnel (see ICIP issue Vol. 5, No. 6, August 2006 for in-depth information on waterline treatment). The CDC recommends the use of sterile coolants and irrigants in connection with all surgical procedures.

— OSAP
Compliance Corner

Occupational Safety and Health Administration (OSHA)
Because OSHA is responsible for enforcing rules that protect the health and safety of the working people of the United States, the agency does not address the issue of hard surface disinfection from a patient safety standpoint. The agency does however, address decontamination of devices before servicing or shipping for repairs. The Bloodborne Pathogens Rule states:

"Equipment which may become contaminated with blood or other potentially infectious materials shall be examined prior to servicing and shipping and shall be decontaminated as necessary, unless the employer can demonstrate that decontamination of such equipment or portions of such equipment is not feasible. A readily observable label in accordance with paragraph (g)(1)(i)(H) shall be attached to the equipment stating which portions remain contaminated. The employer shall ensure that this information is conveyed to all affected employees, the servicing representative, and/or the manufacturer, as appropriate, prior to handling, servicing, or shipping so that appropriate precautions will be taken."
USDOL. Bloodborne Pathogens. OSHA 29CFR 1910.1030

Centers for Disease Control and Prevention (CDC)
Recognizing that cleaning is a vital part of the decontamination process, the CDC provides the following explanation in the Guidelines for Infection Control in Dental Health Care Settings -2003:

"Cleaning is the necessary first step of any disinfection process. Cleaning is a form of decontamination that renders the environmental surface safe by removing organic matter, salts, and visible soils, all of which interfere with microbial inactivation. The physical action of scrubbing with detergents and surfactants and rinsing with water removes substantial numbers of microorganisms. If a surface is not cleaned first, the success of the disinfection process can be compromised. Removal of all visible blood and inorganic and organic matter can be as critical as the germicidal activity of the disinfecting agent. When a surface cannot be cleaned adequately, it should be protected with barriers."
CDC. Infection Control Guidelines for Dental Health-Care Settings -2003. MMWR. December 9, 2003:52(RR-17);1-61

Cutting Edge

The United States and Canada are working towards the development of a guidance document and pilot program that would allow the simultaneous registration of hard surface disinfectants in both countries, with the hope that all of the signatories to the North America Free Trade Agreement (NAFTA) will eventually participate. The draft guidance document is complete; however, it still requires approval of the Canadian Therapeutic Products Directorate. The benefits of allowing products currently marketed in only one country to enter the other NAFTA markets without further registration include the ability to choose from a broader range of products and a consistent standard of quality and claims within the NAFTA countries. This agreement might also streamline the approval process for producers and marketers of environmental surface disinfectants that wish to sell their product in more than one country. For more information on the project, see the NAFTA Pilot Project for Hard Surface Disinfectants at http://www.epa.gov/oppsod01/international/naftatog/2006/label-pilot.pdf (accessed July 19, 2007).
Putting It All Together

Keeping It Clean

Use this guide as a baseline for developing routine protocols for your dental practice to maintain a clean and safe dental unit. Add or delete items as needed to customize this list to the needs of your individual practice. The list is not a comprehensive guide to dental office asepsis, but provides suggestions and strategies for infection control practices for the dental cart and attachments. When performing these tasks it is important for personnel to wear appropriate protective attire.

After each patient
- Remove and discard all equipment and surface barriers
- Clean uncovered touch surfaces, taking special care to remove cement and other materials that do not readily come off with wiping
- Apply disinfectant to cleaned touch surfaces and allow to remain wet for time indicated by the manufacturer to kill all listed organisms
- Remove and prepare to sterilize all detachable items that contact oral tissues
- Clean and lubricate internal components of handpieces according to the manufacturer’s directions
- Carefully clean handpieces with isopropyl alcohol or mild detergent and water according to the manufacturer’s instructions before cleaning, packaging and sterilizing
- Discard all single use items such as disposable air/water syringe tips, plastic evacuator tips and disposable prophy angles

Daily
- Examine cover of patient light and clean as needed
- Perform maintenance on dental water system, if required
- Flush evacuation line cleaner through the hoses according to the manufacturer’s directions
- Conduct a general cleaning of areas around the dental cart and chair that are not part of the normal infection control practices (i.e.; housekeeping procedures to maintain cleanliness of areas not directly involved in patient care)
- Clean areas under barriers as part of routine housekeeping procedures
- Clean all countertops, sinks and other areas within the treatment room
- Inspect non-touch areas for buildup of debris such as impression materials, cements, etc. and remove with appropriate solvent or cleaning agent
- Inspect nitrous oxide equipment for leaks and test scavenging system to ensure a flow of 40 liters per minute (LPM)

Weekly
- Clean bases of chairs to remove build-up of dust and debris
- Examine and clean connection hoses that feed water, air and suction to the dental cart(s)
- Inspect and replace vacuum line traps if needed
- Examine hoses for proper nitrous oxide and oxygen flow and replace as needed (see Practice Tip in this issue of Infection Control In Practice for more information)

As needed
- Conduct waterline testing to validate efficacy of office protocols
- Inspect and maintain amalgam separator
- Inspect hoses inside dental unit control box for water and air leaks
- Inspect and replace vacuum pump filter

Ask OSAP

Q: We noticed that the waterline cleaner we use has chlorhexidine as the active ingredient, so rather than continuing to purchase that product, we mix oral rinse with water and run that through the waterlines. Is this practice acceptable?

A: Only products that have appropriate Food and Drug Administration (FDA) and Environmental Protection Agency (EPA) clearances or registrations are appropriate for use as a waterline cleaner. Testing for safety and efficacy is an important part of the product clearance/registration process. Simply because one product has the same active ingredient as another does not mean that it will provide the same result. Concentration, method of delivery, frequency of use and other ingredients in the formulation all play a part in the product’s ability to have the desired effect.

Do you have an inquiry about infection control, occupational health, or practice safety? Ask OSAP. Send your questions to office@OSAP.org
**Dental Cart and Accessory Maintenance**

Use this guide as a starting point for developing Standard Operating Procedures (SOPs) for the decontamination and maintenance of the dental cart, attachments and accessories. SOPs help ensure that procedures are consistent, regardless of who performs them on a given day.

<table>
<thead>
<tr>
<th>Device/equipment</th>
<th>Decontamination procedure</th>
<th>Routine maintenance &amp; handling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental Cart</td>
<td>Clean and disinfect all surfaces, especially those that encounter dental teams’ gloved hands with a low-to intermediate-level disinfectant. Use barriers where appropriate. Change barriers between each patient.</td>
<td>Check for cracks and leaks in hoses inside the control box. Follow manufacturer’s directions for maintenance.</td>
</tr>
<tr>
<td>Hoses and attachments</td>
<td>Clean and disinfect all parts that contact dental teams’ gloved hands or patient oral tissues with a low-to intermediate-level disinfectant. Use barriers where appropriate. Change barriers between each patient.</td>
<td>Do not touch parts of hoses that contact floor during the procedure (e.g., when pulling hoses to bring devices closer to patient). Avoid corrugated hoses that are difficult to clean. Change cracked or damaged hoses since this may interfere with cleaning ability.</td>
</tr>
<tr>
<td>High-speed handpiece</td>
<td>Carefully clean with isopropyl alcohol or plain water and mild soap to remove all debris. Avoid the use of disinfectants on handpieces. Place in container or pouch for heat sterilization.</td>
<td>Clean and lubricate internal components of handpiece as recommended by the manufacturer.</td>
</tr>
<tr>
<td>Slow-speed handpiece</td>
<td>Carefully clean with isopropyl alcohol or plain water and mild soap to remove all debris. Avoid the use of disinfectants on handpieces. Place in container or pouch for heat sterilization.</td>
<td>Clean and lubricate internal components of handpiece as recommended by the manufacturer. Detach all parts for sterilization.</td>
</tr>
<tr>
<td>High velocity evacuator</td>
<td>Remove and discard disposable evacuator tip after each patient. Thoroughly clean reusable evacuator tip with small brush to remove internal debris before packaging and heat sterilization. Clean and disinfect evacuator attachment and control knob/switch with low-to intermediate-level disinfectant.</td>
<td>Clean evacuation line daily with suitable cleaner. Do not use disinfectants or household cleaners not indicated as intended for cleaning evacuation lines. Follow the manufacturer’s directions for maintenance of the vacuum pump.</td>
</tr>
<tr>
<td>Saliva ejector</td>
<td>Remove and discard saliva ejector after each patient. Thoroughly clean saliva ejector connection and disinfect with low- to intermediate-level disinfectant.</td>
<td>Clean saliva ejector line daily with suitable cleaner. Do not use disinfectants or household cleaners not indicated as intended for cleaning evacuation lines. Follow the manufacturer’s directions for maintenance of the vacuum pump.</td>
</tr>
<tr>
<td>Waterlines</td>
<td>Use an EPA-registered and FDA-cleared dental waterline treatment product or device according to the manufacturer’s directions. Consider routine testing of the waterlines to determine if office protocols in combination with products and/or devices maintain desired water quality.</td>
<td>Carefully follow manufacturer’s directions for use and maintenance of waterlines. Do not use disinfectants, household products or other non-registered and non-cleared materials for waterline biofilm control.</td>
</tr>
</tbody>
</table>
**Critical devices:** Devices that penetrate soft tissue, contact bone, enter into or contact the bloodstream or other normally sterile tissue.

**Hazardous waste:** A waste with properties that make it dangerous or potentially harmful to human health or the environment.

**Intermediate-level disinfectant:** Liquid chemical germicide registered with EPA as a hospital disinfectant and with a label claim of potency as tuberculocidal.

**Low-level disinfectant:** Liquid chemical germicide registered with EPA as a hospital disinfectant. OSHA requires low-level hospital disinfectants also to have a label claim for potency against HIV and HBV if used for disinfecting clinical contact surfaces.

**Medical waste:** Any solid waste generated in the diagnosis, treatment, or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biologicals.

**NAFTA:** North America Free Trade Agreement between the United States, Canada and Mexico enacted in 1994 to eliminate some barriers to trade between the three countries.

**Semicritical devices:** Devices that contact mucous membranes or non-intact skin; will not penetrate soft tissue, contact bone, enter into or contact the bloodstream or other normally sterile tissue.

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**Ask OSAP**

**Q:** We collect leftover amalgam for recycling every time we do an amalgam restoration. Is it necessary to collect the amalgam from the dental traps and the empty amalgam capsules, too?

**A:** Yes, the dental traps usually contain amalgam from the removal of restorations and the amalgam capsules have some material that adheres to the inside. Flushing amalgam down a drain or placing it in the regular trash is a violation of hazardous waste disposal regulations because of the mercury content. The best way to manage this waste is to collect it in a closed container and have it recycled by a hazardous waste management company. Always follow local regulations regarding the collection, labeling and disposal of regulated waste. In addition, some companies provide mail-in service for the reclaiming of waste amalgam for recycling. You may also want to review the American Dental Association’s Best Management Practices for amalgam at [http://www.ada.org/prof/resources/topics/amalgam_bmp.asp](http://www.ada.org/prof/resources/topics/amalgam_bmp.asp).

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**Best Practices**


CDC. Guidelines for Environmental Infection Control in Health-Care Facilities. *MMWR 52(RR10);1-42*


If you wish to obtain one (1) hour of continuing education (CE) credit, complete the following test by selecting the best answer and fax or mail it to the OSAP Central Office for grading. Please include a check or credit card to cover handling charges. Pending satisfactory results (at least seven out of ten), you will be issued a letter for one (1) CE credit hour. OSAP is recognized by the American Dental Association as a CERP Provider. For more information, call OSAP at 800-298-6727 (410-571-0003).

For each question, pick the best answer.

1. ___________ provides an attractive environment for contamination.

2. The extent to which environmental contamination may contribute to the risk of disease transmission is:
   a. unclear  b. well-defined  c. negligible  d. massive

3. Devices that contact oral tissues, such as high- and slow-speed handpieces should be:
   a. barrier protected  b. cleaned and disinfected  c. cleaned and sterilized  d. washed with soap and water

4. In general, discard used evacuation traps as:
   a. medical waste  b. hazardous waste  c. household waste  d. mixed waste

5. Environmental Protection Agency (EPA) standards for drinking water is:
   a. 200 cfu/mL  b. 300 cfu/mL  c. 500 cfu/mL  d. 750 cfu/mL

6. What does the CDC identify as the, “the necessary first step of any disinfection process”?
   a. cleaning  b. product selection  c. sterilization  d. removing barriers

7. The NAFTA Pilot Project will allow for the simultaneous registration in multiple countries of:
   a. high-level disinfectants  b. sterilizers  c. waterline disinfectants  d. hard surface disinfectants

8. Flush evacuation line cleaner through the hoses:
   a. weekly  b. daily  c. monthly  d. as needed

9. Conduct waterline testing to validate efficacy of office protocols:
   a. daily  b. weekly  c. monthly  d. as needed

10. Clean handpieces prior to sterilization with:
    a. isopropyl alcohol  b. low-level disinfectant  c. intermediate-level disinfectant  d. high-level disinfectant

Mail or Fax completed test with the appropriate payment to receive one (1) hour of continuing-education credit.

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MAIL TO: OSAP CE • P.O. Box 6297 • Annapolis, MD 21401 • USA • FAX TO: 410.571.0028
All dental practices that use nitrous oxide should have standard operating procedures for its safe delivery. Besides the need for fail-safe mechanisms, scavenging systems and flow meters, there should also be protocols for determining if leakage of nitrous oxide or oxygen is occurring. Leaky components may result in the unnecessary exposure of dental personnel to unsafe levels of nitrous oxide.

The National Institutes for Occupational Safety and Health (NIOSH) establishes recommended exposure limits for hazardous materials. The recommended occupational exposure limit for nitrous oxide is 25 parts per million over an 8-hour time-weighted average (ppm/TWA).

Routine examination of all rubber or silicone items including but not limited to reservoir bags, delivery tubing, vacuum tubing, connectors, pop-off valves, masks and scavenger for cracks by visual inspection.

Because it can be difficult to detect small leaks by visual examination alone, an easy way to test for leaks is by using the soapy water test. To conduct the test you will need liquid dish soap (not the type for use in dishwashing machines) and water. Mix up a batch of soapy water using one part dish soap to two parts water. Spread the soapy solution on all hoses of the nitrous oxide/oxygen delivery system. Turn on the oxygen at full pressure and block off the end of the hose with your hand. If bubbles appear along the tubing, it means there is a crack or leak in the hose and it needs replacing.

Incorporate the soapy water test into the routine examination of the nitrous oxide equipment to ensure the safety of personnel operating the equipment.


This document also addresses how to monitor for exposure to nitrous oxide, the appropriate levels for oxygen in combination with nitrous oxide, recommendations for scavenging equipment and many other useful and important safety tips.