

Sterilization

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Electric Dental Handpiece Infection Control (1/11)

Question: We recently purchased electric dental handpieces for our clinic, however after reading the manufacturer instructions we realized the motor cannot be heat sterilized. We called the manufacturer and they said that you only had to sterilize the outer housing/sleeve between patients and not the micromotor. Is this ok, or should we return the handpieces?

Answer: To meet current infection control policies the entire handpiece must be heat tolerant, not just the outer housing or sleeve. This is a good reminder to others that you need to review the *USAF Guidelines for Infection Control in Dentistry* and ask questions about infection control before purchasing new equipment or items for your clinic. You cannot always rely on the manufacturers to know the current standards. While many manufacturers and representatives are knowledgeable about current infection-control recommendations, others may not be as well informed. Several years ago, only a few electric handpiece manufacturers offered electric handpieces with heat tolerant micromotors. As manufacturers realized that the Centers for Disease Control and Prevention recommended heat sterilization for any device that can be removed from the air and waterlines, they began to offer products that could be heat sterilized. In summary, unless the entire handpiece can be heat sterilized, including the micromotor and housing around the motor, DECS does not recommend purchasing these electric handpiece systems for USAF dental clinics.

Select Sources for Heat Tolerant Electric Handpieces*

Manufacturer	Contact Information
A-dec	(800) 547-1883 (503) 538-7478 (503) 538-0276 FAX www.a-dec.com
Bien-Air	(800) 433-2436 (949) 477-6050 (949) 477-6051FAX www.bienair.com
Brassler	(800) 841-4522 www.brasselerusa.com
DentalEZ Group/Star Dental	(866) 383-4636 (610) 725-8004 (610) 725-9898 FAX www.dentalez.com
KaVo	(800) 323-8029 (704) 927-0816 FAX www.kavousa.com

*The listing or omission of a product in this table does not imply endorsement, approval, or disapproval by DECS. The product examples listed are not intended to be all-inclusive or represent recommendations by the USAF.

References

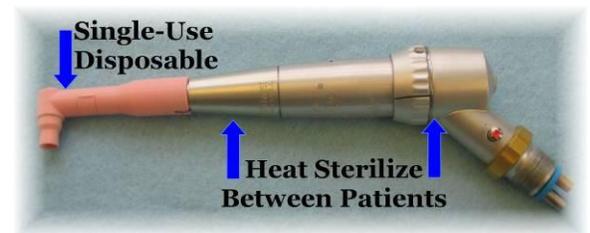
- American Dental Association Council on Scientific Affairs. Professional Product Review. 2010:Volume 5/Issue 3.
- CDC. Guidelines for infection control in dental health-care settings – 2003. MMWR 2003; 52(No. RR-17):1–66.
- Food and Drug Administration. Dental handpiece sterilization [Letter]. Rockville, MD: US Department of Health and Human Services, Food and Drug Administration, 1992.
- USAF Guidelines for Infection Control in Dentistry.

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Disposable Prophylaxis Angles and Sterilizing Low-Speed Motors (4/10)

Question: If we use a disposable prophylaxis angle, do we need to heat sterilize the low-speed handpiece motor?

Answer: Yes, all handpieces and attachments, including motors, must be heat sterilized between patients unless they are single-use disposable items. Recent studies have shown the internal portions of some low-speed handpiece motors have the potential to become contaminated when used with both disposable and reusable prophylaxis angles. The studies also have shown that there is the potential for internal contamination to be released through the prophylaxis angle into the mouth of a patient during subsequent uses. In summary, unless all components of handpieces are properly heat sterilized between patients, there is the potential for microorganisms to enter, remain, and then be released during use on patients.



References

- CDC. Guidelines for infection control in dental health-care settings – 2003. MMWR 2003; 52(No. RR-17):1–66.
- Chin JR, Miller CH, Palenik CJ. Internal contamination of air-driven low-speed handpieces and attached prophylaxis angles. J Am Dent Assoc 2006;137:1275–1280.
- Chin JR, Westerman AE, Palenik CJ, Eckert SG. Contamination of handpieces during pulpotomy therapy on primary teeth. Pediatr Dent. 2009;31:71–75.
- Herd S, Chin J, Palenik CJ, Ofner S. The in vivo contamination of air-driven low-speed handpieces with prophylaxis angles. J Am Dent Assoc 2007;138:1360–1365.
- USAF Guidelines for Infection Control in Dentistry.

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Heat Tolerant Cheek Retractors & Mirrors (12/09)

Question: A new dentist in our clinic insists that their photographic cheek retractors and mirrors cannot be heat sterilized and just wants to “wipe them down” with our clinic disinfectant between patients. I know this isn’t acceptable. Do you know of any companies that sell heat-tolerant cheek retractors and photographic mirrors?

Answer: The *USAF Guidelines for Infection Control in Dentistry* are very clear—intermediate or low-level disinfectants intended for use on environmental surfaces are **not** to be used to clean and disinfect dental instruments used intraorally. Additionally, heat-tolerant alternatives are available for both cheek retractors and mirrors, so using an item that can’t be heat sterilized is a compromise and is not recommended.



Select Sources for Heat Tolerant Cheek Retractors and Photographic Mirrors*

Manufacturer	Contact Information
Clinipix	www.clinipix-on-line.com (866) 254-6749 (561) 793-4142 (561) 798-6721 FAX
Lester A. Dine Inc.	www.dinecorp.com (800) 624-9103 (561) 624-9100 (561) 624-9103 FAX
PhotoMed	www.digitaldentalcameras.com (800) 998-7765 (818) 908-5369 (818) 908-5370 FAX
Washington Scientific Camera Co.	(253) 863-2854 (253) 863-2854 FAX

* The listing or omission of a product/manufacture in this table does not imply endorsement, approval, or disapproval by DECS.

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Immediate-Use (Flash) Steam Sterilization (9/08) **UPDATED** (7/11)

Question: Can you provide a review of flash sterilization? Is there anything new?

Answer: “Flash” steam sterilization is defined as a process designed for steam sterilizing, or autoclaving, patient-care items for immediate use. This is in contrast to “terminal” sterilization where instruments are sterilized in packaging materials designed to maintain the instruments’ sterility during storage until they are used at a later point in time. Earlier this year, the Association for the Advancement of Medical Instrumentation (AAMI) issued a statement using new terminology which they felt more adequately describes this process and provides clarification on several issues that had caused confusion in the past (e.g., various cycles used for steam sterilization; availability of special packaging materials for “flash” cycles). The new term “immediate-use steam sterilization” more accurately describes the current use of these processes. The statement **does not** include any new requirements or changes to the process; it’s just an updated term to clarify the process for those using it. Current guidelines for cleaning, decontamination, monitoring, and transporting sterilized items still apply.

Currently, the time required for immediate-use (flash) sterilization depends on the type of sterilizer and the type of item (i.e., porous vs. non-porous items). An immediate-use (flash) sterilization cycle usually operates at higher temperatures for shorter times and the cycle is preprogrammed to a specific time and temperature setting established by the manufacturer based on the type of sterilizer (e.g., gravity displacement, prevacuum). To allow immediate contact with the steam in the short cycle, the instrument is usually unwrapped. However, if manufacturer instructions allow, special types of packaging materials may be used. If “flash” sterilizing critical instruments (e.g., surgical instruments) intended for immediate use, they must be handled aseptically during removal from the sterilizer and transport to the point of use (e.g., transported in a sterile covered container). **Immediate-use (flash) steam sterilization should be used only in carefully selected clinical situations when certain conditions are met; it should not be used for reasons of convenience, as an alternative to purchasing additional instrument sets, or to save time.**

Immediate-Use (“Flash”) Steam Sterilization: Do’s and Don’ts

DO	DON'T
<ul style="list-style-type: none"> - Clean and dry instruments before the sterilization cycle. - Use mechanical, chemical, and biological indicators for each sterilization cycle. - To avoid contamination and thermal injury, allow instruments to dry and cool in the sterilizer before they are handled. 	<ul style="list-style-type: none"> - Do not use immediate-use (flash) steam sterilization for reasons of convenience, as an alternative to purchasing additional instrument sets, or to save time. - Do not package or wrap instruments used during immediate-use (flash) sterilization unless the sterilizer is specifically designed and labeled for this use. - Do not use immediate-use (flash) steam sterilization cycles for implantable devices.

Selected References

- Association for the Advancement of Medical Instrumentation (AAMI): Immediate-Use Steam Sterilization. Available at http://www.aami.org/publications/standards/ST79_Immediate_Use_Statement.pdf. Accessed July 2011.
- CDC. Guidelines for infection control in dental health-care settings–2003. MMWR 2003;52(No. RR-17).
- Rutala WA, Weber DJ, and the Healthcare Infection Control Practices Advisory Committee. Guideline for disinfection and sterilization in healthcare facilities, 2008.

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Sterilizing Hinged Instruments (5/07)

Question: Should hinged instruments be sterilized in the opened or closed position?

Answer: Sterilization can be achieved only if the sterilizing agent (e.g., steam) contacts all instrument surfaces. Therefore, hinged instruments, such as hemostats, scissors, and extraction forceps, should be sterilized in the open position to ensure that the sterilizing agent adequately contacts all surfaces.



Reference

Association for the Advancement of Medical Instrumentation, American National Standards Institute. Comprehensive guide to steam sterilization and sterility assurance in health care facilities. ANSI/AAMI ST79:2006. Arlington, VA: Association for the Advancement of Medical Instrumentation, 2006.

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Sterilizing Low-Speed Handpieces (11/04) **UPDATED** (5/16)

Question: Do low-speed handpiece motors require heat sterilization between patients?

Answer: Yes, dental handpieces and associated attachments (i.e., low speed motors, reusable prophy angles, and sterilizable ultrasonic scaler handpieces) are heat sterilized in between patients. Do not use high level or intermediate level disinfectants on these items. Although these devices are considered semi-critical items, studies show that the internal surfaces can become contaminated. If these devices are not properly cleaned and heat sterilized, it is possible that patients could be exposed to potentially infectious material.



Reusable air water syringe tips and any other dental device connected to the dental air/water system that enters the patient's mouth should be run to discharge water, air, or a combination for a minimum of 20-30 seconds after each patient and before heat sterilization. This procedure is intended to help physically flush out patient material that might have entered the turbine and air and waterlines. Additionally, it's important to follow manufacturer instructions for use (IFU) regarding cleaning and lubrication requirements for each handpiece and to use separate cans of the lubricant/cleaner before and after sterilization to prevent cross-contamination.

Some items are permanently attached to dental unit waterlines (e.g., handles or dental unit attachments of saliva ejectors, high-speed evacuators, and air/water syringes) and although they do not enter the patient's oral cavity, they are likely to become contaminated with oral fluids during treatment procedures. These items should be covered with impervious barriers that are changed after each use. If the item becomes visibly contaminated during use, it should be cleaned and disinfected with an EPA-registered intermediate-level disinfectant before use on the next patient.

For the 2016 Summary of Infection Control Prevention Practices in Dental Settings Basic Expectations for Safe Care, please click [here](#).

Selected References

- CDC. Summary of Infection Prevention Practices in Dental Settings: Basic Expectations for Safe Care. Atlanta, GA; US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Oral Health: 2016.
- CDC. Guidelines for infection control in dental health-care settings – 2003. MMWR 2003; 52(No. RR-17):1–66.
- Chin JR, Miller CH, Palenik CJ. Internal contamination of air-driven low-speed handpieces and attached prophy angles. J Am Dent Assoc 2006; 137:1275–1280.
- Herd S, Chin J, Palenik CJ, Ofner S. The in vivo contamination of air-driven low-speed handpieces with prophylaxis angles. J Am Dent Assoc 2007;138:1360–1365.
- USAF Guidelines for Infection Control in Dentistry.

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Bead Sterilizers (2/04)

Question: Are bead sterilizers an effective means of sterilization?

Answer: A bead sterilizer is a device using glass beads 1.2–1.5 mm diameter and temperatures 217°C–232°C for brief exposures (e.g., 45 seconds) to inactivate microorganisms. This term is actually a misnomer because it has not been cleared by the Food and Drug Administration (FDA) as a sterilizer. Bead sterilizers have been used in dentistry to sterilize small metallic instruments (e.g., endodontic files), however they are not acceptable for sterilization of items between patients. Studies have shown inconsistent heating and significant temperature variation in these devices. Also, there is no system to monitor exposure of the instrument to sterilization conditions or to demonstrate that sterilization exposure parameters have been achieved in the device. Furthermore, there is no way to maintain sterility of items following removal from the bead sterilizer.



The FDA is the governmental agency that regulates medical and dental devices. The FDA has determined that a risk of infection exists with these devices because of their potential failure to sterilize dental instruments and has required their commercial distribution cease unless the manufacturer files a premarket approval application. If a bead sterilizer is used, dental health-care personnel assume the risk of employing a dental device FDA has deemed neither safe nor effective.

Common acceptable methods for heat sterilization include steam, dry heat, and unsaturated chemical vapor. The only sterilization devices that should be used in dental offices are those that have been approved by the FDA.

References

- CDC. Guidelines for infection control in dental health-care settings – 2003. MMWR 2003; 52(No. RR-17):1–66.
- U.S. Department of Health and Human Services Food and Drug Administration. 21 CFR Part 872 Dental Devices; Endodontic Dry Heat Sterilizer; final rule. Federal Register 1997;62(13):2900–2903.

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Dry Heat Sterilizers and Using them Effectively (Updated September 2004)

Question: Some of the people in our clinic want to purchase a dry heat sterilizer. What is a dry heat sterilizer? Are there different types, and what are their operational recommendations?

Answer: Dry heat (DH) sterilization is accomplished by heating air that is in contact with the instruments. The main advantage of DH sterilization is that it prevents the type of corrosion of carbon-steel instruments and burs commonly seen with steam sterilization.

DH sterilization is not without some drawbacks, however. Since DH sterilizers use no pressure (unlike steam autoclaves and chemical vapor sterilizers), longer and hotter treatment cycles must be used. Also, instruments must be properly separated when placed into a DH sterilizer or heat diffusion in and around the instruments can be impaired, rendering the sterilization process ineffective.

There are two types of DH sterilizers: static-air and forced-air. Static-air types are often referred to as "dry heat ovens." In these units, air is heated in the chamber by electric coils located on its floor. The hot air then rises and heat is transferred to the instruments. Sterilization is accomplished in one to two hours at 320°F (160°C). Proper warm-up (usually 15 to 30 minutes from a cold start) is important. When the operational temperature is reached, the sterilization process begins. Once the cycle is started, the sterilizer door should not be opened until the end of the cycle. The other main type of DH sterilizer is the forced-air type which is often called a "rapid heat transfer" sterilizer. In these sterilizers, heated air is mechanically circulated through the chamber. As a result, instruments are heated more quickly. Warm-up time is also shorter than for the static-air type of DH sterilizer. The cycle time, however, must start only when the sterilization conditions have been reached.

The following operational recommendations should be followed:

1. Use only units that are FDA-cleared for use as sterilizers. Household ovens and toaster ovens are unacceptable.
2. Check cycle timing and operational temperatures each day the unit is used. Keep a logbook of recorded values.
3. Observe a "warm-up" period prior to starting a treatment cycle. When operational temperatures are reached, cycle timing can begin.
4. Do not open the unit's door during the cycle. Door opening results in a significant temperature drop. If the door is opened, the cycle must be restarted.
5. Use tubing, wrapping materials, cassettes, and trays designed for DH sterilization. Closed containers can be used, but cloth and most types of paper should be avoided.
6. Do not sterilize plastic items or adhesive tapes. This can cause them to distort, burn, or release toxic gas.
7. Separate items on all levels by at least ½ inch. Trays or packs should be no more than two layers deep with the top layer at a right angle to the lower one. Adequate air circulation is important. Avoid overloading.

8. Clean the unit with a mild detergent once a week. Units should be rinsed well and allowed to air dry. Check the chamber door and insulation to ensure they are in good condition. Always unplug the unit prior to cleaning and inspection.
9. Use an appropriate chemical indicator strip as recommended by the manufacturer.
10. Place a biological indicator within a tray, pack, pouch, or cassette at least once a week. *Bacillus atrophaeus* spores are used to test DH. Use a spore test to confirm appropriate kill in closed containers.

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The Main Components of a Dental Clinic's Sterilization Quality Assurance Program (Updated September 2004)

Question: What are the main components of a dental clinic's sterilization quality assurance program?

Answer: All clinics should use a system with three types of monitoring: mechanical (recording devices), chemical (heat-sensitive strips to determine that instruments have been exposed to the sterilization agent), and biological (spore testing). By using the three types of monitoring, you establish a pattern of performance by your sterilization equipment. Continued successful performance data provide evidence that sterility is occurring on a consistent basis. All three processes are unique, have different functions, and must be used consistently with proper instrument cleaning, packaging, sterilization, storage, and distribution techniques to ensure sterility.

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Residual Air Removal Test for Pre-Vacuum Sterilizers (Originally published in the May 2003 issue of InCONTROL)

Question: What is a Bowie-Dick test?

Answer: The Bowie-Dick test is an air removal test for prevacuum steam sterilizers. The test is designed to detect air leaks and inadequate air removal. Residual air remaining in the chamber prevents steam from contacting the items in a load and therefore interferes with sterilization. Air removal tests do not apply to gravity-displacement sterilizers. The test is conducted daily in an empty chamber, before the first processed load of instruments. Generally, a short cycle is run first to properly heat the sterilizer, then the test pack is placed in the empty sterilizer chamber, near the door, over the drain, however manufacturer's instructions should be followed for the specific product being used. In addition to the daily test, the Bowie-Dick test should also be performed during initial sterilizer installation, following sterilization failures (i.e., positive biological indicator), and after sterilizer relocation, malfunction or repair. Please visit the Infection Control Product Evaluation section of the DECS Web site for a synopsis of air removal tests for prevacuum steam sterilizers.

Reference

Association for the Advancement of Medical Instrumentation, American National Standards Institute. Comprehensive guide to steam sterilization and sterility assurance in health care facilities. ANSI/AAMI ST79:2006. Arlington, VA: Association for the Advancement of Medical Instrumentation, 2006.

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