

# Keeping the “A” in Asepsis

## First Look

Part of the audit process that I perform for dental facilities is evaluating their offices in the mind’s eye of the patient. When I drive up to a facility, I first look at how the grounds are kept. Is the landscaping well groomed? Is there litter in the parking lot? Weeds? Is the front door soiled or clean? I open the door and look around at the waiting room. Is it orderly or cluttered? Next, I ask to use the restroom. Is it clean? Are there disposable cups stacked on the vanity rather than in a wall-mounted receptacle? Are there unwrapped rolls of toilet paper or are they neatly individual wrapped so they are not soiled before use? Is the plumber’s helper stuck behind the toilet? I look in the cabinet under the sink. You can imagine my concern when I find it very soiled, cluttered, and yes, I have found used toothbrushes and personal items for the staff. Now you know the old saying, “Check out the restroom first before you eat at a restaurant. If it is nasty, what in heaven can they be doing in the kitchen?” The same thoughts go through a patient’s mind at the dental office.

Now I have just broken all the rules of journalism by not even mentioning asepsis in the first paragraph, but what I *have* done is to set you up to look at what patients see. They probably do not know what asepsis or aseptic technique is. All they know to do is be on a heightened alert if they have already seen things that are not up to par. They can complain to the Arizona State Board of Dental Examiners (BODEX) that things are not clean and then BODEX investigators will look at your aseptic technique.

Why is this such an important subject? **Aseptic technique is the first line of defense against infection.** It is also one of the 16 points on the BODEX inspection list that is used when unscheduled visits

are made at dental offices. BODEX has adopted the most current State OSHA required procedures for worker protection and the most current CDC recommended Infection Control Practices for Dentistry as the guidelines for infection control.<sup>1</sup> *Question number 9 on the inspection list is as follows: Is aseptic technique performed adequately (avoidance of cross contamination during all procedures)? a. by Dentist, b. by Hygienist c. by Dental Assistant.* In my estimation, that is one big order to fill. So let’s look at the subject of asepsis.

**DEFINITION:** Sepsis is usually defined as “a severe illness caused by an overwhelming infection of the bloodstream by toxin-producing bacteria.” In many definitions, putting an “a” in front of a word means “without.” In medical terms, **asepsis** is “the absence of poisonous matter and disease causing organisms.” Aseptic technique is the process of inhibiting the growth and multiplication of microorganisms. To define aseptic technique further, we usually refer to two separate categories:

**Surgical asepsis** refers to the process of rendering and keeping objects and areas free of all microorganisms. The goal to achieve surgical asepsis is directed toward the elimination of all microorganisms.

**Medical asepsis** refers to the practice of reducing the transfer of pathogens from one person to another either directly or indirectly. Medical asepsis, through a clean environment, is the state of being free of pathogenic organisms.

In order for us to maintain an aseptic environment, we need to determine when to sterilize, when to disinfect, and when to just clean the dental environment.

## Categories of Patient Care Items

Let’s review Spaulding’s Classifications. In the mid-twentieth century, Dr. Earle H. Spaulding divided patient care items into three categories based on the risk of infection involved in their use. The three categories were critical, semi-critical and noncritical. This system has had universal acceptance in the infection control community, has been refined over the years and still is in use today. I reference these classifications frequently in this column, as they remain the basis for deciding how we treat items in dentistry that are used for more than one patient. The following are the updated categories of patient care items.

**Critical Items:** Critical items present a high risk of infection to the patient if the items are contaminated with any microorganism. If the objects enter normally sterile tissue or the vascular system, they should be rendered sterile to prevent disease transmission.

## Learning Objectives

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

- identify the proper treatment of a patient care item according to its risk classification;
- list the appropriate steps for sterilizing instruments;
- identify the first line of defense against infection.

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Continued on page 60

These objects should be purchased as sterile, or heat sterilized, if possible, and *kept sterile until time of use*. Of all the methods available for sterilization, moist heat in the form of saturated steam under pressure is the most widely used and the most dependable.<sup>2</sup> Heat sensitive objects can be treated by chemical sterilants, but this presents numerous challenges for the process to be done correctly regarding cleaning, contact time, proper dilution, temperature and pH. In dentistry, invasive dental instruments such as scalpel blades, bone chisels and periodontal scalers are critical devices that should be sterilized after each use.

**Semi-critical Items:** Semi-critical items address objects that come in contact with mucous membranes. We rarely deal with intact mucous membranes by the very nature of dental treatment. In addition, we use both critical and semi-critical objects in most dental procedures so the patient care items should be processed at the higher, critical level and use sterilized or single-use items that will be placed in the mouth. Semi-critical devices such as amalgam condensers and air-water syringe tips that are heat tolerant should be heat sterilized after each patient. Handpieces should be heat sterilized between each patient use and handpieces that cannot be heat sterilized should be eliminated from use. Items that are not heat tolerant should be at least processed by high-level disinfection. Fortunately, most dental devices that enter the oral cavity are heat tolerant.

**Noncritical Items:** Noncritical items are items that come in contact with intact skin; cleaning and intermediate or low-level disinfection is necessary if bioburden is present. Risk is only present if the contaminated objects come in contact with mucous membranes or non-intact skin. Dental chairs and blood pressure cuffs are examples of noncritical items and should be cleaned between patient use.

**Environmental Surfaces:** The Centers for Disease Control and Prevention (CDC) has further divided noncritical surfaces into clinical contact and housekeeping surfaces. These environmental surfaces are considered to carry the *least risk* of disease transmission, as they generally do not come into direct contact with patients during care.

In the 2003 Guidelines for Environmental Infection Control in Health-Care Facilities Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC)<sup>3</sup>, it was determined that dental units and countertops were considered environmental surfaces and therefore could be safely cleaned and disinfected with intermediate or low-level disinfectants. If the surfaces such as light handles or chair switches are contaminated with potentially infectious material, they require disinfection. If covered with barriers, disinfection is not necessary unless the barriers are breached. Other environmental surfaces not contaminated can be cleaned with detergent and water or a disinfectant that is also a good cleaner. Make a conscious effort to eliminate surfaces in the dental operatory that are hard to clean and disinfect. Damaged countertops and peeling paint on equipment or walls should be repaired or replaced. **You cannot clean or disinfect a surface if it's not intact.**

### High-Risk Categories for Patient Care Items

When looking at the above classifications and the categories according to risk, the highest risks to the patient are in the critical and semi-critical categories. Therefore, these two areas should be where we put our biggest resources. If the patient care items are single use only and not used on another patient, we have solved the problem. It is in the reuse of the critical and semi-critical objects that we must make sure we are

proceeding correctly. What I often see is only half of the procedure is done properly. Items are sterilized and then handled inappropriately, stored poorly, unwrapped, and open to the elements. When sterile items are open to air, they will eventually become contaminated. The longer a sterile item is exposed to air, the greater the number of microorganisms that will settle on it.<sup>4</sup>

### Instrument Processing

In my OSHA workshops, I always discuss the 2003 Center for Disease Control and Prevention (CDC) Dental Guidelines.<sup>5</sup> These guidelines should be mandatory reading for all clinical dental personnel. For this article I will discuss several areas from these guidelines for the proper procedures to render instruments reusable for the next dental patient. *Note: See page 53 for information and to register for Kay's next OSHA Manual Workshop in Scottsdale.*

**Central Processing Area:** Reusable instruments, supplies, and equipment should be received, sorted and cleaned in one section of the processing area. The area should have a dirty to clean to sterile flow.

**Cleaning:** Cleaning is the necessary first step of any disinfection process. Cleaning should precede all disinfection and sterilization processes; it should involve removal of debris. An automated process (e.g., ultrasonic cleaner or washer/disinfector) is the safest form of cleaning. Ultrasonic cleaners or washer/disinfectors do not require presoaking or scrubbing of instruments and can increase productivity, improve cleaning effectiveness, and decrease worker exposure to blood and body fluids. And, no, you cannot use ponytail holders to bind instruments together before placing them in the ultrasonic. The ultrasonic action will not be effective with the instruments bound together. Only after mechanical cleaning has been performed,

**CLASSIFICATION AND TREATMENT OF DENTAL PATIENT CARE ITEMS**

Classification	Contact	Method of Treatment	Type of Treatment	Example
Critical	Sterile tissue/ Vascular	Sterilize	Heat	Dental instrument
Semicritical	Intact mucous membranes	Sterilize or use disposable	Heat if possible or high-level disinfection	Impression tray
Noncritical	Intact skin	Clean or disinfect	intermediate or low level disinfectant	Dental chair
Environmental	no direct contact with patient	Clean	low level disinfectant	Countertop



Top: Instrument wrapping area.  
Bottom: Wrapped instruments  
in sterilizer.

should any attempt be made to clean by hand. If visible debris, whether inorganic or organic matter, is not removed, it can serve as a barrier and can compromise the disinfection or sterilization process. After cleaning, instruments should be rinsed with water to remove chemical or detergent residue. Splashing should be minimized during cleaning and rinsing. Allow the instruments to dry before further processing. Wet objects can dilute liquid disinfectants and wet instruments can contribute to degradation of the instruments during steam sterilization. Before final disinfection or sterilization, instruments should be handled as though contaminated.

**Preparation and Packaging:** In another section of the processing area, cleaned instruments and other dental objects should be inspected, assembled into sets or trays, and wrapped, packaged, or placed into container systems for sterilization. Hinged instruments should be processed open and unlocked. An internal chemical indicator should be placed in every package. In addition, an external chemical indicator (e.g., chemical indicator tape) should be used when the internal indicator cannot be seen from outside the package.

### Storage of Sterilized Items and

**Clean Dental Supplies:** Critical and semi-critical instruments that will be stored should be wrapped or placed in containers (e.g., cassettes or organizing trays) designed to maintain sterility during storage. Packaging materials (e.g., wraps or container systems) allow penetration of the sterilization agent and maintain sterility of the processed item after sterilization. Materials for maintaining sterility of instruments during transport and storage include wrapped perforated instrument cassettes and peel pouches of plastic or paper.

The storage area should contain enclosed storage for sterile items and disposable (single-use) items. Storage practices for wrapped sterilized instruments can be either date- or event-related. Packages containing sterile supplies should be inspected before use to verify barrier integrity and dryness. Although some health-care facilities continue to date every sterilized package and use shelf-life practices, other facilities have switched to event-related practices. This approach recognizes that the product should remain sterile

**Continued on page 62**

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indefinitely, unless an event causes it to become contaminated (e.g., torn or wet packaging). Even for event-related packaging, minimally, the date of sterilization should be placed on the package, and if multiple sterilizers are used in the facility, the sterilizer used should be indicated on the outside of the packaging material to facilitate the retrieval of processed items in the event of a sterilization failure. If packaging is compromised, the instruments should be re-cleaned, packaged in new wrap, and sterilized again. Clean supplies and instruments should be stored in closed or covered cabinets, if possible, and at least 8 to 10 inches from the floor. **Dental supplies and instruments should not be stored under sinks or in other locations where they might become wet.**

**The CDC says: "Do not store critical instruments unwrapped"<sup>6</sup>**

## Organization Counts

### Room for Processing Patient Care Items:

In auditing dental facilities, I pay close attention to the instrument processing procedures. Only in rare cases has enough room been set aside for safe and productive instrument processing. If you



Top & Bottom: Enclosed storage.

are contemplating revamping your office or building anew, please allow enough area that will permit efficient processing.

**Cassettes and Tub Systems:** I see few offices embracing the concept of cassettes for safety and efficacy. The use of cassettes increases productivity and decreases risk of occupational exposure to bloodborne pathogens. You can place instruments for a particular procedure in a container that can be closed and placed in a washer disinfectant or ultrasonic machine without further handling of the instruments. It is the ultimate time saver. Instruments do not need to be sorted out after the mechanical washing. Covered tubs are used to store the various items needed for your different procedures. The time saved with a cassette and tub system will be such a difference that you will wonder how you ever managed without them. Less time, less stress, less chance for error, safer for patients and staff.

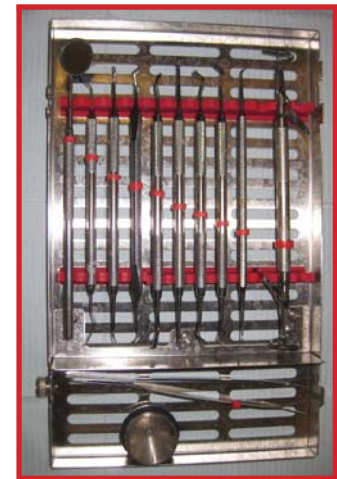
So there you have it. Feel free to tackle all the reference material I have cited especially if you have a hard time falling asleep. It is safer than taking a sleeping pill and has no ill side effects. You will be better informed and ready to meet the day in your well-run office.

## Waste Management Update

**Orthodontic Biohazard Waste:** If you are an orthodontic practice and the only biohazard waste that you generate is metal bands and wires, you do not have to go through the whole sharps containers routine. I posed the following question to Steven Weberman, Industrial Hygiene Consultant at the Arizona Division of Occupational Safety and Health (Arizona's OSHA), and Industrial Commission of Arizona. "... about ortho sharps, as there are only metal bands and wires that can be cleaned and sterilized, I feel that they do not have to be put into the hazardous waste category... your thoughts on it."

Steve's reply: *The OSHA answer is this: If ...sharps can be sterilized and disinfected and rendered to be bio-hazard/blood-borne pathogens free then there is no bio-hazard exposure and therefore the wires and bands would not be considered regulated waste at that point, they would be regular everyday trash, having said that there is still the sharp hazard within itself that could poke and cut the skin, so placing the wires and bands in a puncture resistant container/envelope and then to be discarded in regular trash would be acceptable.*

Top: Cassettes and tubs.  
Bottom: Amalgam instruments banded in order of use in a cassette.



This means that if you run the bands and wires in your ultrasonic and then heat sterilize them and put them in a puncture resistant container/envelope (I prefer those envelopes made out of synthetic material that are virtually impenetrable), you can put them in the regular trash; you do not need to purchase sharps containers and arrange for biohazard disposal. Good news for all you orthodontists out there.

## Hand Hygiene Update

**C. Diff and Hand Hygiene:** The Fifth Decennial international conference on healthcare-associated infections (HAI) was held in Atlanta, Georgia in March of this year. Its primary function is to set the agenda for HAI prevention for the next decade. A study presented at the conference related the information that a new superbug is on the rise in hospitals that is even more threatening than MRSA (Methicillin resistant *Staphylococcus aureus*), a drug resistant staphylococcal infection. MRSA is found on the skin and is harmless until it invades the body

through wounds and other avenues. This new superbug is *Clostridium difficile*, a gram-positive, anaerobic, spore-forming bacillus commonly known as *C. diff*. Actually, it has been around a long time. This bug is spread by spores in feces. It causes diarrhea and can develop into a fulminating life-threatening colitis. The spores are difficult to kill and some alcohol-based hand sanitizers that are effective for MRSA do not kill the *C. Diff*.

*C difficile* forms heat-resistant spores that can persist in the environment for several months to years. Outbreaks of *C difficile* diarrhea may occur in hospitals and other outpatient facilities where contamination with spores is prevalent. Fortunately, this does not affect the dental community as in the normal dental setting, we do not anticipate fecal contamination; therefore the alcohol-based hand sanitizers are safe and effective to use.

As always, if you have any questions, feel free to e-mail me at [Kay@azda.org](mailto:Kay@azda.org) (all inquiries and their sources remain confidential).

### References

<sup>1</sup>State of Arizona Board of Dental Examiners, Agency Substantive Policy Statement #1, Infection Disease Control In The Dental Office; 1-7. [http://www.azdentalboard.us/substantive\\_policy.pdf](http://www.azdentalboard.us/substantive_policy.pdf)

<sup>2</sup>CDC Guideline for Disinfection and Sterilization in Healthcare Facilities, William A. Rutala, Ph.D., M.P.H.1,2, David J. Weber, M.D., M.P.H.1,2, and the Healthcare Infection Control Practices Advisory Committee (HICPAC)3; 2008; 58. [http://www.premierinc.com/safety/topics/guidelines/downloads/Disinfection\\_Nov\\_2008.pdf](http://www.premierinc.com/safety/topics/guidelines/downloads/Disinfection_Nov_2008.pdf)

<sup>3</sup>Guidelines for Environmental Infection Control in Health-Care Facilities, Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC), U.S. Department of Health and Human Services, Centers for Disease Control and Prevention (CDC) 2003; 72. <http://www.premierinc.com/safety/topics/guidelines/downloads/cdc-guide-enviro-ic-12-03-03.pdf>

<sup>4</sup>CDC Guideline for Disinfection and Sterilization in Healthcare Facilities, William A. Rutala, Ph.D., M.P.H.1, 2, David J. Weber, M.D., M.P.H.1,2, and the Healthcare Infection Control Practices

Advisory Committee (HICPAC)3, 2008; 60. [http://www.premierinc.com/safety/topics/guidelines/downloads/Disinfection\\_Nov\\_2008.pdf](http://www.premierinc.com/safety/topics/guidelines/downloads/Disinfection_Nov_2008.pdf)

<sup>5</sup>Guidelines for Infection Control in Dental Health-Care Settings, December 19, 2003 52(RR17);1-61. <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5217a1.htm>

<sup>6</sup>Guidelines for Infection Control in Dental Health-Care Settings, December 19, 2003 52(RR17); 45. <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5217a1.htm>

Kay Carl is board certified in infection control and epidemiology. She has over 35 years experience in infection control and has worked in collaboration with AzDA since 1991 to provide continuing education in OSHA, infectious diseases and infection control. She is an active member of OSAP, the national dental infection control association, and a prolific contributing author and editor for various industry print and electronic media.

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1. Aseptic technique is the first line of defense against infection.

- a. True  
 b. False

2. Which of the following statements is not true?

- a. Aseptic technique is the process of inhibiting the growth and multiplication of microorganisms  
 b. Every single patient care item in the dental office must be kept sterilized before reuse.  
 c. Surgical asepsis refers to the process of rendering and keeping objects and areas free of all microorganisms.  
 d. Medical asepsis, through a clean environment, is the state of being free of pathogenic organisms.

3. Which patient care items must be sterilized between each patient use?

- a. Dental chairs  
 b. Clinical counter tops  
 c. Periosteal elevators  
 d. Blood pressure cuffs

4. Which patient care items are considered to carry the highest risk of disease transmission, patient to patient?

- a. Dental chairs  
 b. Clinical counter tops  
 c. Blood pressure cuffs  
 d. Periosteal elevators

5. Cleaning patient care items is:

- a. the first step in processing items for reuse.  
 b. is not necessary if you are going to disinfect them.  
 c. is not necessary if you are going to sterilize them.  
 d. an unnecessary step.

6. Using which of the following can prove safe and effective and improve employee time management?

- a. Washer/disinfectors  
 b. Washing instruments by hand  
 c. Cassettes and tubs  
 d. a. and c. only

7. Storage of sterile items include:

- a. keeping the items in a wrapped pack.  
 b. placement in enclosed storage under sinks.  
 c. inspection of packaging to verify barrier integrity and dryness.  
 d. a. and c. only

8. If a package of sterile items is compromised, it:

- a. should be recleaned and packaged in new wrap.  
 b. should be sterilized again.  
 c. can be used for a procedure; just don't let it happen again.  
 d. a. and b. only

9. According to reports at The Fifth Decennial international conference on healthcare-associated infections held in Atlanta in March of this year, dental healthcare workers can no longer use alcohol-based hand hygiene products, as they are ineffective against *Clostridium difficile*.

- a. True  
 b. False

10. When packaging instruments for sterilization, you should:

- a. place a chemical indicator inside each package.  
 b. date the package and indicate which sterilizer was used in case of sterilizer failure.  
 c. mark when the packaging will expire.  
 d. a. and b. only

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