STERILE PROCESSING BASIC TRAINING: SPD BOOT CAMP®

Module #11:
Introduction to High-Level Disinfection

by

The Central Sterile Processing Initiative

Sterile Processing Basic Training: SPD Boot Camp

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Note: This e-Book is optimized for viewing on a computer screen, but it is organized such that one can print it out and assemble it as a print textbook. Since the text is optimized for screen viewing, the text is larger than that found in usual print books.

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Message From The Central Sterile Processing Initiative Director

Thank you for purchasing this e-course, an introductory and review survey of the basics of sterile processing, *Sterile Processing Basic Training: SPD Boot Camp.* Thank you, enjoy the program, and I am always just an e-mail away if you have questions or need my assistance during the course of your studies. Sincerely, Our Sterile Processing Team	www.centralsterileprocessing.net

Preface

This e-course is neither the traditional textbook nor the typical student workbook. It is, rather, a combination of the best and most relevant of information related to the basics of sterile processing education and training presented much like a series of lecture notes with multimedia elements included for a more complete and well rounded educational experience for both sterile processing "newbies" and seasoned veterans simply seeking a comprehensive review alike.

The content is structured as a classroom lecture/text with all relevant points discussed and references provided for further information and investigation.

In this text one will be presented with material contained within the industry standard texts, current field relevant articles, and as well have workspace much like contained within the likewise standard workbooks. Herein, however, the student will find no superfluous material to bog one down unnecessarily. Covered within is only that which one needs to know as a sterile processing tech at the level 1 stage—the ESSENTIALS of sterile processing, that which every tech need know—the prerequisites of the field. References will be cited throughout the course, however, to point students in the right direction should they choose (and we are trusting that they will!) to pursue additional knowledge, training, and advancement in the field of sterile processing.

The course consists of multiple individual modules (at least 15 at the time of this printing). Please read through each module from beginning to end at least once before attempting to complete the assignments and then work your way back through the text completing the required coursework specified in the assignment directions at the end of the module (see contents).

Module 11: Introduction to High-Level Disinfection

Objectives

- Comprehension of the concept of *high-level disinfection*
- Be able to compare and contrast high-level disinfection with decontamination and sterilization
- Understanding of basic high-level disinfection procedures and compounds
- Compulsory logging and compliance

Module 11: Introduction to High-Level Disinfection

Introduction
Disinfection, though related, is distinct from both decontamination and sterilization. *Disinfection* is the utilization of a chemical or chemical compound to perform mortification of the total microbial count of an inanimate object (e.g., surgical instrumentation, flexible scope, etc.) with the exception of bacteriological spores. A *disinfectant* is then, as such, a chemical utilized to achieve disinfection.

The distinction between high-level disinfection and sterilization is that sterilization eradicates all microbial life (in terms of the SAL or sterility assurance level parameters), *to include microbial spores*, whereas disinfection eradicates microbial life with the exception of spores.

Effectiveness of the Disinfection Process
The effectiveness of disinfection, much like parameters for manual/mechanical cleaning, as well as sterilization, depends upon on meeting a specific parameter set. For disinfection, the parameter set includes:

- Effective pre-cleaning/cleaning
- Thorough drying (no water or cleaning solution should remain as this will impede surface contact of item to be disinfected with disinfectant)
- Appropriate match of microbial load with microbe-specific disinfectant or general broad spectrum agent
- Adequate exposure time of item to disinfectant, commensurate with appropriate placement of items so that total critical surface area is exposed to disinfectant
- Medical device compatibility (must follow the manufacturer's

specifications for cleaning and disinfection of device)

Other factors include the water quality (hardness, pH, etc.) as well as water temperature (temperature can impact the effectiveness of disinfectant solutions much as is the case with enzymatic detergents).

Disinfectant Selection

Disinfectant selection depends upon several critical factors. We have already discussed one of these above (correct selection of disinfectant for specific microbial contaminant). The other important factor for the sterile processing professional to consider is that of, not only device type, but *device usage and application*. See table below.

Processing Methodology	Device Intent of Usage	Rating
Decontamination/ Sanitization	Device comes into contact with skin only; small risk of infection transmission	Noncritical Device
High-Level Disinfection	Devices comes into contact with skin and/or mucous membranes (greater risk of infection transmission)	Semicritical Device
Sterilization	Device utilized for invasive procedures (e.g., comes into contact with critical areas as in surgical procedure); high risk of infection transmission	Critical Device

In the table above (referred to as the *Spaulding Classification*) one can determine the ideal (and standard mandated!) processing methodology for surgical instrumentation and equipment in terms of device rating, i.e., noncritical, semicritical, and critical.

Minimum Effective Concentration (MEC)
Just as is the case with sterilization, i.e., sterilization must be monitored and validated throughout the continuous process, so too must high-level disinfection be monitored to ensure adequate exposure in terms of time and effective concentrations of chemical solution utilized (disinfectant).

In high-level disinfection what is being monitored is *the minimal effective concentrations of the disinfectant*, or, the *MEC*.

Prior to utilization of a disinfectant, the sterile processing technician, via a manufacturer supplied test strip, tests the concentration of the disinfectant to ensure that the strength and quality of the solution are such as to guarantee safe and effective disinfection.

One must consult the product manufacturer's instructions for their respective products.

Important High-Level Disinfectants in Sterile Processing
The two primary high-level disinfectants utilized in the sterile processing department are *ortho-phthalaldehyde* and *glutaraldehyde (a popular name being Cidex)*. There are other disinfectants occasionally utilized in the sterile processing and endoscopy departments but the two aforementioned are, by and large, the most common as well as most practical in terms of high-level disinfection validation within practical time parameters in the medical setting.

Ortho-phthalaldehyde (OPA) can be utilized in either an appropriate soak pan (pan utilized for *manual* soaking) or in an *AER (automated endoscope reprocessor)*. It is typically a 0.55% solution and is an effective high-level disinfectant at average room temperature. It has broad spectrum activity and is relatively safe when compared with glutaraldehyde products. The general parameters for OPA are:

- 12 minute soak time (room temperature) for manual soak/disinfection
- 5 minute soak time in automated system
- Rinse post soak exposure with fresh water to remove residual OPA (which has been associated with burns on patients when not removed adequately from OPA treated equipment)

Glutaraldehyde is classified as both a disinfectant and sterilant. In 2.00% solution, for extended periods of time (8+ hours), glutaraldehyde can also deactivate biological spores. In light of other, more time efficient and post-sterilization containment procedures and processes, glutaraldehyde is rarely used in the healthcare setting as a sterilant.

Glutaraldehyde is typically applied for 45 minutes to achieve high-level disinfection with semicritical medical devices. Soaking is the most common method of utilization of this compound.

Most disinfectants, such as OPA and glutaraldehyde, must be activated pre-use and have limited shelf life (typically from 14-28 days post activation).

As both are harsh chemicals, the technician must always consult the medical device manufacturer's guidelines prior to use of such solutions for product specific processing directions.

When handling such chemicals, PPE must be donned as required. Consult OSHA guidelines, hospital standards, as well as the MSDS to ensure adequate understanding of chemicals being utilized in the department.

Glutaraldehyde can be particularly toxic in terms of toxic and harmful fumes. Appropriate ventilation must be in place per OSHA and EPA guidelines and a monitoring platform in place to ensure employee safety.

Logging High-Level Disinfection Processes and Validation

The standards and best practices require thorough logging of all processes related to high-level disinfection similarly to sterilization logging and record keeping.

Minimum information required in a high-level disinfection log which is compliant:

1) Documentation of MEC testing

2) Item processed

3) Date item processed

4) Time into the high-level disinfectant (whether manual soak tub or AER)

5) Time removed from disinfectant medium

6) Processing technician's name/initials

As we will discuss further in the sterilization module, records should be complete, accurate, kept current, and stored per governmental policy and recommended standards for the method of disinfection in question and for the specified required timeframe.

For further reflection...What is the importance of accurate and compliant process logging?

Conclusion

For items not being processed by means of terminal sterilization (whether gas, steam, or plasma) due to manufacturer's guidelines or device type, disinfection is the second best alternative though sterilization is always preferable where possible, especially in terms of critical devices and procedures requiring violation of a sterile area of the body.

Disinfection is an effective means of eradicating biological masses with the exception of biological spores, however, disinfection banks upon effective pre-cleaning to remove all bacteriological and general soil residue to provide sufficient surface contact between the disinfectant solution and the item being processed. Cleaning is the primary first step in both disinfection and sterilization.

The two primary disinfectants in hospital SPDs are OPA and glutaraldehyde.

Great care must be taken with these chemicals in terms of appropriate PPE, environmental and personal health considerations, and also in terms of choosing the correct disinfectant for the job. Such disinfectants discussed above should never be used as surface disinfectants but only as indicated in the service literature.

Manufacturer's directions should be followed completely to protect the patient, the equipment, and—YOURSELF.

Required Readings, Recommended Readings,and Other Resources

Required Reading
Module 11

http://findarticles.com/p/articles/mi_m0FSL/is_2_81/ai_n13470567/

http://www.sgna.org/Resources/guidelines/guideline6_print.html

http://www.cdc.gov/ncidod/dhqp/bp_sterilization_medDevices.html

http://www.steris.com/media/pdf/news/product/2009/Resert-XL-HLD-US-TradeRelease-Final.pdf

Recommended Reading
Central Service Technical Manual, Seventh Edition. Chapter 10.

Chobin, Nancy, Ed. The Basics of Sterile Processing, Third Edition. Chapter 5.

Recommended Links
N/A

Module Assignments

Module 11 Assignments

1) Read the module in its entirety from cover to cover at least once.

2) Do a survey of the web for 3 entries per each on *high-level and surface disinfectants* and provide a 2-3 paragraph summary of your findings on each as relates to the module.

3) Read the assigned, mandatory readings provided via HTML links.

4) Independently, find 3 additional articles online related to the module and summarize (provide web link).

5) Discuss the paper by Steris on their Resert product. Discuss why this product looks promising for sterile processing disinfection processes. Discuss as well what the down side might be to the product, if any, (Hint: oxidation). Minimum 5 paragraphs.

6) Perform a Google search for the term oxidation and discuss how oxidative chemistries might relate to sterile processing in terms of disinfection and sterilization (point of use sterilization).

7) Perform a web search for instrumentation related to each of the classifications of instrumentation and medical devices per the Spaulding scheme. List at list one instrument/device matching the category.

8) Perform a web search for low-level disinfection. Compare and contrast this with high-level disinfection (relate both the SPD). 3-5 paragraphs.

9) Complete the module quiz (posted online separately 3-5 days after posting of this module). Submit with above documents to info@centralsterileprocessing.net. In subject line, type

"Module 11 Assignments." In body of e-mail, submit full name.

END MODULE 11