

CRCST Self-Study Lesson Plan

Lesson No. CRCST 153 (Technical Continuing Education - TCE)

Sponsored by:

3M Health Care

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Basics of Ultrasonic Cleaning

LEARNING OBJECTIVES

- 1. Understand the importance of ultrasonic cleaning
- 2. Learn how to prepare the ultrasonic unit for cleaning
- 3. Learn how to prepare instruments for ultrasonic cleaning
- 4. Understand the safety measures that apply to ultrasonic cleaning



This series of self-study lessons on CS topics was developed by the International Association of Healthcare Central Service Materiel Management (IAHCSMM). Purdue University's Extended Campus and IAHCSMM both offer grading opportunities.

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LTRASONIC (SONIC) CLEANING ENHANCES THE INSTRUMENT cleaning process by cleaning complex, hard-to-clean areas of medical devices. The cavitation (cleaning) process can be enhanced or hindered by many factors, including manual cleaning, solutions used, instrument complexity, and the adherence to proper loading and maintenance instructions.

Staff knowledge regarding the ultrasonic cleaning process is critical for ensuring proper instrument cleaning. This lesson plan will address the important factors necessary for the proper use of ultrasonic cleaning processes.

OBJECTIVE 1: UNDERSTAND THE IMPORTANCE OF ULTRASONIC CLEANING

An ultrasonic cleaner is a type of mechanical cleaning device used for fine cleaning of instrumentation and other medical devices. It is especially effective in cleaning difficult-to-clean areas, such as joints, crevices, box locks, hinges, spring areas and lumens. Ultrasonic cleaners are used in healthcare and electronics applications, as well as for cleaning jewelry.

This mechanical cleaning process removes soil from instrumentation through a process of cavitation and implosion. Sound waves produce small gas bubbles that grow and then implode, creating a vacuum that draws out trapped debris from hinges, serrations and other hard-to-reach areas. The bubble implosion creates a cleaning action that disrupts the bond that causes soil to adhere to the instrument surfaces, thereby, pulling the debris away from the instrument surface.

Sonic cleaners do not disinfect or sterilize instruments; however, when used in conjunction with manual cleaning, sonic cleaning can enhance the cleaning process and increase the bactericidal effectiveness of the disinfection and sterilization processes.

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OBJECTIVE 2: PREPARING THE ULTRASONIC UNIT FOR CLEANING

Sonic cleaners may have one or more chambers. A single-chamber unit may be a clean-only model or it may clean, rinse and dry in the single chamber. Multiplechamber units may have two or three separate chambers, with each function performed in a specific chamber. The process for preparing single- or multiplechamber units for use is essentially the same. It is essential to follow the manufacturer's Instructions for Use (IFU) to properly prepare the equipment. The following steps must be performed prior to using an ultrasonic unit:

- Check the cleaner and power cord for damage before each use. If damage is noted, remove the unit from service until appropriate repairs can be completed.
- Check the detergent level and ensure there is enough detergent available for the entire shift. Detergents should be approved for use in a sonic cleaner and should also be low foaming, free rinsing, nontoxic, nonabrasive and, preferably, biodegradable.
- Thoroughly clean, disinfect, rinse and dry the chamber(s) at least daily. Chamber maintenance should be performed more frequently, depending on the level of contaminates on instruments and/or if the cleaning solution is soiled. Heavily- soiled solutions may inhibit the effectiveness of the ultrasonic cleaning process, which will require the solution to be changed more frequently (including after every use).
- Fill the chamber with water and the approved cleaning chemical. If the chemical must be added manually, be sure the appropriate amount of cleaning chemical is used (mixing too much or too little will interfere with the cleaning process).
- · De-gas the sonic unit. Place an

approved and empty wire mesh basket inside the chamber and run the cycle per the manufacturer's IFU. De-gassing removes air and gasses from the solution that will interfere with the cleaning process. De-gassing should be performed each time the solution is changed. *Note: Newer models of ultrasonic cleaners may automatically de-gas the solution. Following degassing the equipment is ready for use.*

- The cleaning solution should be checked after each cycle. If debris is noticed, the chamber should be completely drained, cleaned, refilled and de-gassed prior to subsequent use.
- Test sonic effectiveness. Testing equipment effectiveness is required weekly, but, preferably, daily. There are several commercial products available for testing sonic cleaners that test the cavitation and unit's cleaning ability. Be sure to place all testing material in the sonic in accordance with IFU. All test results should be carefully documented. Any failed tests should be reported immediately and the equipment should be removed from service until appropriate repairs can be made.

OBJECTIVE 3: PREPARING INSTRUMENTS FOR ULTRASONIC CLEANING

When using a sonic cleaner, proper precleaning and positioning of instruments is important for effective cleaning.

For manual cleaning, the following steps should be followed:

- Loosen screw and wing nuts, or disassemble instruments in accordance with IFU before cleaning.
- Soiled instruments should be rinsed using cool water to remove gross debris and prevent coagulation of protein on the instruments.
- Carefully manually clean the



Figure 1: Improperly loaded tray

instruments in accordance with IFU. All lumens should be carefully brushed and flushed. Inappropriately-cleaned instruments will interfere with the cavitation process.

• Rinse and inspect instrumentation for debris.

When arranging cleaned instruments for sonic cleaning, the following steps should be followed:

- Place manually-cleaned instruments inside an approved wire mesh tray. Separate different metals (mixing of some metals will transfer ions that can cause pitting and etching).
- Place hinged instruments in a fully open position.
- Cannulated/lumened instrumentation should be primed (completely filled with sonic solution) and placed in the

horizontal position as the tray is place inside the chamber.

- Avoid overcrowding instruments in the mesh tray (adequate space is necessary for solution circulation). Figure 1 shows instruments that are crowded in a tray, not allowing for proper solution irrigation.
- Place one loaded instrument tray into the ultrasonic cleaner. *Note: Trays should never be stacked.*
- » Multi-level trays should be separated before placing inside the sonic chamber.
- » Tray lids should be removed and placed into the sonic chamber, in accordance with the IFU.
- Check the instrument manufacturer's IFU for the appropriate cycle time.
- Rinse and inspect instruments
 - » If the sonic unit does not have an automatic rinse cycle, remove the instrument tray and thoroughly rinse items with treated water. Rinsing is important to remove dislodged particles and residual detergent. Note: All instruments should be rinsed prior to placing them in a washer-disinfector.
 - » Inspect all instruments for blood and bioburden. If instruments are soiled, repeat the entire cleaning process, beginning with manual cleaning.
 - » Inspect instruments to ensure all screws, springs, wing nuts and washers are present. If any are missing, carefully check the bottom of the sonic cleaner for the missing items.

Note: If using an irrigating sonic unit, it is essential to ensure the instruments are connected properly, in accordance with IFU. Check to ensure the irrigation tubing is not clogged prior to connecting the instruments.



Figure 2: Testing irrigation hose

Figure 3: Damaged chest retractor



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Figure 2 shows the proper water flow through an irrigation hose.

Although ultrasonic units are effective for many medical devices, they do have some restrictions. The following should not be subjected to ultrasonic cleaning:

- Heat- or moisture-sensitive instruments;
- Some delicate and intricate instruments, including endoscopic or rigid scopes, vaginal or TEE probes, cameras, most power instrumentation, cords and batteries;
- Plated instrumentation, such as those that are ebonized or chrome plated (See Figure 3); and
- Cork, wood, rubber, lenses, glass and most needles.

A note about sonic cleaning eye instruments: Toxic Anterior Segment Syndrome (TASS) is an inflammatory response in the eye following surgery. TASS can be caused by debris or chemical residuals on instrumentation. Because TASS can lead to severe visual impairments, special cleaning recommendations have been developed.

Sonic cleaners dedicated to the processing of eye instruments should be placed in a separate area, away from general instrumentation cleaning, and dedicated to the processing of eye instrumentation cleaning. The sonic should be emptied, cleaned, disinfected, rinsed and dried at least daily, but, preferably, after each use.

OBJECTIVE 4: SAFETY MEASURES THAT APPLY TO SONIC CLEANING

When using a sonic cleaner, the following basic safety measures must be followed:

- Do not use the sonic cleaning unit until properly trained to do so.
- Keep the lid closed during operation to protect against aerosols and splashing.
- Never place anything on the lid. The lid can become damaged by the tray weight, or instrumentation may be damaged if

the lid opens and the tray falls.

- Do not place hands into the unit while it is in operation.
- Do not use if cords are nicked or damaged in any way

CONCLUSION

Ultrasonic cleaners are effective tools to assist with the cleaning of some of today's complex instrumentation. It is critical that Central Service technicians understand the processes involved with using a sonic cleaner. They must carefully and consistently follow all manufacturers' IFU for the proper cleaning, preparation, placement, solution use and cycle times. Doing so will help ensure the ultrasonic cleaning unit operates efficiently and effectively, and produces a clean instrument. **()**

RESOURCES

Association of periOperative Registered Nurses. Guidelines for Perioperative Practice. Guideline: Instrument Cleaning. 2016.

Association for the Advancement of Medical Instrumentation. ANSI/AAMI ST79, *Comprehensive guide to steam sterilization and sterility assurance in healthcare facilities*. 2013, Sections: 3.3.7.1, 3.3.7.2, Annex N.

IAHCSMM ACKNOWLEDGES THE FOLLOWING CS PROFESSIONALS FOR THEIR ASSISTANCE IN THE CRCST LESSON PLAN SERIES

Damien Berg, CRCST Nicholas Schmitz Susan Klacik, ACE, FCS, CHL, CIS, CRCST Anna Clarkson, CHL, CIS, CRCST Don Williams, CHL, CIS, CRCST Gwendolyn Byrd, CHL, CIS, CRCST Deborah Bunn, ACE, CHL, CIS, CRCST Mattie Castro, CHL, CHMMC, CIS, CRCST Michelle Clark Christina Poston, CHL, CIS, CRCST Donna Serra, CHL, CRCST

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CRCST Self-Study Lesson Plan Quiz -Basics of Ultrasonic Cleaning



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OBJECTIVE 1

- **1.** Ultrasonic cleaners are used to clean:
 - a. Box locks
 - b. Serrations
 - c. Difficult-to-clean instruments
 - d. All the above
- Ultrasonic cleaners were designed specifically for the healthcare industry.
 a. True
 - b. False
- **3.** Ultrasonic cleaners clean by a process called:
 - a. Impingement
 - b. Explosion
 - c. Cavitation
 - d. All the above
- 4. During ultrasonic cleaning, gas bubbles are created that grow and implode, which pulls the soil away from the instrument.
 - a. True
 - b. False
- 5. When instruments are properly manually cleaned, sonic cleaners will disinfect instruments during the cleaning process.
 - a. True
 - b. False

OBJECTIVE 2

- **6.** Before using a sonic cleaner, the entire unit and power cord should be checked for damage.
 - a. True
 - b. False

- **7.** All sonic cleaners have two or three chambers.
 - a. True
 - b. False
- **8.** The detergents used in an ultrasonic cleaner should be:
 - a. Maintained at 150°F
 - b. Abrasive
 - c. Low foaming
 - d. All the above
- **9.** Sonic cleaners should be cleaned and disinfected at least daily.
 - a. True
 - b. False
- **10.** De-gassing should be performed:
 - a. Daily
 - b. After every cycle
 - c. Each time the solution is changed
 - d. All the above

OBJECTIVE 3

- 11. When using an ultrasonic cleaner, instruments do not need to be precleaned before being placed into the sonic.
 - a. True
 - b. False
- 12. Cannulated instruments:
 - a. Need no preparation prior to sonic cleaning
 - b. Should be placed in the vertical position in the chamber
 - c. Should be primed and placed in a horizontal position in the chamber
 - d. Cannot be cleaned in an ultrasonic cleaning unit

- **13.** When placing items in a sonic cleaner: a. They should be placed in an
 - approved wire mesh basket b. Hinged instruments should be in
 - b. Hinged instruments should be in the open position
 - c. Multi-level trays should be separated
 - d. All the above
- Ultrasonic cleaners used for cleaning of eye instruments should be placed in a separate area, away from the general instrument cleaning area.
 a. True
 - b. False

OBJECTIVE 4

- **15.** Safety measures for using an ultrasonic cleaner include:
 - a. Keeping the lid closed during operation
 - b. Only using the sonic cleaner after proper training
 - c. Not placing items on the sonic lid
 - d. All the above

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