
E14CL4

Caring for Complex Instruments

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LEARNING OBJECTIVES

1. Review point-of-use treatment processes
2. Discuss manual cleaning procedures for complex instruments
3. Explore mechanical cleaning processes for complex instruments
4. Explain the importance of maintaining a quality review process

As surgical procedures have advanced, many of the instruments in use have become more complex. Complex instruments are found in almost every medical specialty. Cleaning these devices is more time-consuming and difficult, with some devices taking more than an hour each to properly clean. These instruments have made the Sterile Processing (SP) technician's job more challenging.

What is a complex instrument? While most would agree that flexible endoscopes and robotic arms are complex, any device that presents a cleaning challenge should be considered complex. This can include moisture-sensitive devices, like powered handpieces and cords; neurosurgical instruments, such as Kerrison rongeurs; loaned or seldomly used devices that are unfamiliar to processing technicians; and sets with known issues or frequently identified errors.

Complex instruments may require multiple cleaning and decontaminating steps along with meticulous inspection. Although the most important guidance is to carefully follow the specific instructions for use (IFU) for every instrument, this lesson reviews common processing steps.

Objective 1. Review point-of-use treatment processes

The main goal of every Sterile Processing department (SPD) is to provide properly processed and well-functioning surgical instruments and other devices to user departments. Improperly processed devices pose a threat to the patient and facility. The very important first step in this process is point-of-use (POU) treatment. POU treatment begins during the procedure as the instruments are used. As the physician uses the instruments, gross soil needs to be removed, and all lumens flushed using sterile water. After the procedure, carefully follow each instrument's IFU for POU treatment. General guidelines include:

Remove gross soil – All used instruments should have gross soil removed following the facility's procedures and devices' IFU to prevent debris from drying and possible instrument damage. Non-immersible devices should be carefully wiped to remove gross soil without placing them in water.

Flush lumens – Debris left in lumens, especially small lumens, can dry and

clog the channel, making cleaning very difficult. Instruments, like very small ENT and neurosurgical suctions, may need to be sent out or discarded due to the inability to properly clean the dried debris.

Disassemble multipart devices – All multipart devices need to be disassembled immediately after the procedure to allow for gross soil removal and enable pretreatment solutions to contact all surface areas and prevent remaining debris from drying.

Place instruments in their proper container – Keeping instruments together helps streamline the time it takes to process sets, especially those with a quick turnaround. Searching for instruments to complete sets or missing parts of disassembled instruments takes significant time and increases the duration a set is out of service.

Discard or isolate sharps per facility policy – Discard single-use sharps. Place reusable sharp devices in dedicated transport containers. Sharps should be separated from other devices to prevent instrument damage during transport and protect decontamination technicians from injury.

Treat instruments with an approved pretreatment solution – Using an approved surfactant or enzymatic moistening solution is important for keeping soiled instruments moist so debris cannot dry and cause further processing challenges or instrument damage.

Properly prepare items for transport – To protect against cross-contamination, all items should be placed in closed containment devices clearly marked as biohazardous. All containers must be carefully placed in the cart so damage does not occur during transport. Soiled instruments should be delivered to the decontamination area as soon as possible after POU treatment to reduce the opportunity for biofilm formation.

Note: Proper POU treatment does not replace any aspect of the cleaning process in the decontamination area. Every item must still undergo full processing in the SPD.

Objective 2: Discuss manual cleaning procedures for complex instruments

Manual cleaning is an important process. Some technicians, however, think they can skip it because of advances in mechanical cleaning. That is far from the truth. Nothing replaces the manual cleaning step. It is the beginning of fine soil removal and when the first assessment of an instrument occurs. Manual cleaning instructions are included in each instrument's IFU, demonstrating that manufacturers also know this process is essential to obtaining clean instruments.

Once received in the decontamination area, every complex instrument must be inspected for cracks, defects, missing or broken parts, chips, holes in air hoses, exposed wires, and leakage of bearing oils, among other concerns. Damaged instruments should be properly cleaned, tagged and removed from service for repair or replacement.

When cleaning complex devices: Disassemble any instruments not disassembled during POU treatment. Use the correct chemicals for cleaning and be sure to mix them as stated in the IFU. Soak the instruments for the recommended time. Decreasing the soak time will leave the instruments harder to clean; increasing the soak time may damage the instruments. Remember each instrument in the set may have different soaking and cleaning instructions, even if they look very similar.

After soaking, clean each instrument using the tools recommended in its IFU and following these general guidelines:

- Keep all immersible instruments under the surface of the water to avoid aerosolization.
- Use soft brushes of the correct bristle material and size for the crevices and lumens. A water pick or air pistol with the correct size tip may also be used.
- Rinse each instrument with the correct type of water. Be sure the detergent is completely rinsed off each device. Instruments must be thoroughly rinsed, even if they will be mechanically cleaned.
- Inspect all instruments for cleanliness; using lighted magnification will assist with this process. Reclean instruments as needed.
- Dry per the manufacturer's IFU. Using a soft lint-free towel or air gun, if approved, will help. Check each IFU as some instruments may require forced-air drying.

For instruments that cannot be immersed: Using the recommended solution carefully wipe the outside of the instrument with a damp, lint-free towel. Be careful to keep the towel damp, not wet, as wet solutions may damage the device. Some instruments need to be held in a specific position to prevent fluid invasion and avoid other damage during the cleaning process. Refer to the IFU for details. Rinse using a clean towel to wipe the outside of the instrument; this may need to be repeated several

times per the IFU. Do not rinse under running water unless specifically stated in the IFU. Inspect for cleanliness, and reclean if necessary.

Objective 3: Explore mechanical cleaning processes for complex instruments

As previously stated, cleaning complex instruments is a time-consuming, multistep process. Steps are not to be skipped or modified, as the manufacturer has tested the cleaning process and determined the steps in the written instructions are necessary to achieve a clean device. Some IFU specify the brands and models of mechanical cleaners to be used to clean their instruments. These instruments need to be cleaned in a specific piece of equipment as tested and validated by the manufacturer. Prior to any mechanical cleaning process, all instruments must be properly manually cleaned and rinsed. Select a low-foaming chemical as recommended by both the equipment and instrument manufacturer. Do not overcrowd the instrument trays; to be effective, the mechanical cleaning solution must contact all surfaces of every device.

Ultrasonic cleaners – Low-foaming ultrasonic solutions are developed to not interfere with the cavitation process. Solutions should be changed frequently and then degassed, if required, prior to placing instruments in the chamber.

All instruments should be opened and placed in a tray recommended for use in the ultrasonic. If the instruments require sonic irrigation, place the correct connector on each instrument and confirm the connector is placed on the proper port. Use the correct cycle and time for the instruments being cleaned. Ensure the instruments are completely rinsed after ultrasonic cleaning, even if they are going through another mechanical process. Carefully check each instrument for cleanliness, and reclean if necessary.

Washer-disinfectors – As with ultrasonic cleaners, the chemicals used in washer-disinfectors need to be low foaming. Excess foam not only interferes with the cleaning process but can damage the washer. All detergents from previous cleaning methods need to be completely rinsed prior to placing instruments in the washer-disinfector.

Today's washers offer a wide selection of trays and manifolds (racks) for use. Always select the tray and manifold appropriate for both the instruments to be cleaned and the cycle to be used. All hinged instruments need to be secured in an open position and placed in the appropriate basket. Place heavy instruments below lighter ones. All instruments should be placed in a manner that will protect them from leaving the tray during the washer's operation. Multilevel trays need to be separated and loaded so each layer is separate (not stacked). Remove all tray covers (lids); if not removed, tray covers will prevent the cleaning solution and rinse water from reaching all instruments. If instruments are to be irrigated, be sure to use the appropriate manifold and connectors. Do not exceed the maximum load weight limit. Place trays on the appropriate manifold, ensuring they do not interfere with the manifold or chamber's spray arms. Select the appropriate cleaning cycle.

Objective 4: Explain the importance of maintaining a quality review process

Having a quality review process is the cornerstone of any successful SPD. Quality review helps the SP team know where it stands with the quality of the products being sent to the customer and keeps the department headed in the right direction. This knowledge gives the department the opportunity to continue to improve by helping identify issues related to processes, education, staffing or instruments. Every facility should develop a quality control process to verify the effectiveness of the cleaning protocols used for complex instruments.

A robust visual inspection process should be consistently used to begin the verification of the cleaning process. Early identification of cleaning deficiencies or instrument damage is important to be able to reprocess deficient items in a timely manner so they can be returned to service promptly. Using lighted magnification in both the decontamination and assembly areas enhances the visual inspection process.

Several types of commercially prepared systems are available to verify cleaning effectiveness. The products used should be appropriate for the instrument being inspected. Failure to perform quality checks or monitor the cleaning process may lead to disinfection or sterilization failures. A testing system should be developed for each type of complex device and testing frequency noted. Instruments that have posed a problem for the SP team should be tested more frequently than items that have consistently been processed successfully.

No quality process is complete without evaluating equipment operation. Each piece of equipment needs to be tested, at a minimum, according to the current standards. If the equipment is not functioning properly, it should be pulled from

service and repaired promptly. Malfunctioning equipment will not result in correctly cleaned instruments.

Each employee who participates in the cleaning process, including surgical suite team members who perform POU treatment, should receive training in all aspects of the cleaning process (or the parts for which they are responsible) and have competency verified and documented. No one should be asked to clean a device or use a piece of equipment without first passing a competency test on that item. Retraining should occur on a scheduled basis and as issues occur. All training should be documented.

Surveying and visiting the department's customers is a good way to gauge their perceptions of the quality of the products and services provided by the SPD. Conducting only internal audits will give a one-dimensional view of the department's overall quality and operations. Customer feedback is an important addition to any quality management program.

As deficiencies are identified, they must be addressed immediately. The longer concerns go unaddressed, the harder it will be to retrain the people involved. Document all steps taken and the adjustments required moving forward. Review the interventions to confirm they are successful and working as intended.

Conclusion

Cleaning complex instruments is a time-consuming and meticulous process in which careful attention to detail is required. SP professionals, including instrument specialists, should never attempt to clean an instrument until they have been properly trained. They must also carefully follow the instrument manufacturer's IFU to consistently provide clean, safe and well-functioning instruments for patient use.

CIS Self-Study Lesson Plan Quiz: Caring for Complex Instruments

Lesson No. CIS 309 (Instrument Continuing Education – ICE) · Lesson expires April 2027

1. Part of the Sterile Processing department's (SPD's) quality process includes:
   a. Soliciting feedback from customers to get their perceptions of the department's quality output
   b. Using a commercial product to check the effectiveness of the cleaning process
   c. Accurate documentation of all activities and findings
   d. All the above

2. The instrument cleaning process begins:
   a. In the decontamination area
   b. At the point of use
   c. When sterile packaging is opened
   d. When instruments are inspected

3. Disassembly of complex instruments and the removal of gross soil should occur:
   a. As soon as the instruments arrive in the decontamination area
   b. During the procedure
   c. Within one hour of the end of the procedure
   d. Following the procedure at the point of use

4. Soiled instruments should be delivered to the decontamination area:
   a. As soon as possible after point-of-use treatment
   b. Within two hours of the procedure's completion
   c. Submerged in an approved detergent in a covered container
   d. In a puncture-resistant bag that contains sterile water

5. Complex instruments should be transported from the procedural area to the decontamination area:
   a. In a closed cart
   b. In a containment system that allows the instruments to remain in sterile water
   c. In an open container with all like instruments transported together
   d. Pre-soaked and ready for the washer

6. When performed properly, point-of-use treatment replaces the need for manual cleaning in the decontamination area.
   a. True
   b. False

7. Complex instruments should be inspected for damage:
   a. Once received in the decontamination area
   b. At the point of use
   c. While being transported to the decontamination area
   d. By only certified technicians

8. Increasing an instrument's soak time:
   a. Improves cleaning outcomes
   b. May damage the device
   c. Can be done for non-electrical devices
   d. Is helpful for some devices

9. Water picks or air pistols should not be used on complex instruments.
   a. True
   b. False

10. Which is a true statement about rinsing complex instruments?
   a. Immersible instruments should always undergo three separate rinsings
   b. Non-immersible instruments should be quickly rinsed under running water
   c. Non-immersible instruments should be carefully wiped
   d. All the above

11. When using ultrasonic cleaners:
   a. High-foaming solutions are preferred
   b. Devices should be fully rinsed afterward
   c. Devices should be placed in the closed position
   d. Complex devices are easily damaged

12. When using a washer-disinfector:
   a. Multi-level trays should be separated
   b. Low-weight trays should be stacked
   c. Tray lids must not be removed
   d. Hinged devices must be in the closed position

13. Which of the following could be considered a complex instrument?
   a. Loaned devices
   b. Flexible endoscopes
   c. Neurosurgical instruments
   d. All the above

14. When cleaning complex instruments:
   a. The process is time-consuming
   b. Meticulous attention to detail is required
   c. Technicians must carefully follow the manufacturer's IFU
   d. All the above

15. Instruments that have presented a cleaning problem:
   a. Should be removed from inventory
   b. Require extended cleaning cycles
   c. Should be tested more frequently
   d. Should undergo a longer soak

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