Cleaning, Handling & Care of Powered Surgical Instruments

BY NATALIE LIND, CRCST, CHL, FHSPA, DIRECTOR OF EDUCATION—HSPA

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LEARNING OBJECTIVES

1. Discuss the role of powered surgical instruments (PSIs) in surgical procedures and basic cleaning techniques for the devices
2. List cautions to take when handling PSIs
3. Learn strategies for staying abreast of PSI processes and current information

The label "powered surgical instrument" (PSI) can apply to several types of powered devices used in healthcare procedures. Like other surgical instruments, PSIs have evolved over time. As specific needs are identified, the development of new PSIs or the modification of existing ones makes it possible to provide the function needed for a range of applications. PSIs are complex in their design and present challenges for those who process them.

This lesson addresses general considerations for handling three types of PSIs: electric-powered, pneumatic air-powered and battery-powered. These devices are often used in hospitals, surgery centers, dental clinics, and veterinary facilities. In each case, patient safety must remain the top priority. Sterile Processing (SP) professionals must manage the contaminated devices after use—decontaminating, inspecting, packaging and sterilizing them to help ensure they are functional and safe for the subsequent use.

It is important to note that this content provides only a general discussion. Several types of PSIs are available, and the term PSI is akin to using the general term "tools." In both cases, various devices with varied functions are available, and each is different. That makes understanding each instrument, becoming familiar with its instructions for use (IFU), and attaining competency for each device critical for ensuring they are handled and processed correctly.

Objective 1: Discuss the role of powered surgical instruments (PSI) in surgical procedures and basic cleaning techniques for the devices

PSIs are essential in modern surgical procedures. Like most surgical instruments, each was developed to fill a specific need, and many PSIs became models for other powered devices with similar features. Neurosurgery, otology, orthopedics and dentistry have all greatly impacted the development of PSIs. The instruments are now used in almost every surgical and dental subspecialty.

Power modalities vary. The most common are pneumatic, battery and electric. Pneumatic and electric PSIs have power cords, while battery-powered PSIs use an insertable battery. The development and refinement of these instruments is often driven by need and user input, helping to make procedures safer and more efficient.

Point-of-use treatment serves as the first step in any PSI's reprocessing journey. During the procedure, surgical staff should keep the instrument free of gross soil, and when the procedure is completed, they should prepare it for hand-off to those in Sterile Processing. When SP professionals receive the devices, they must prioritize the decontamination process to help ensure that blood and other soil on the devices do not dry. Dried blood and fluids make the decontamination process more challenging. They can also contribute to biofilm formation, which is especially difficult to clean and remove. As with other surgical devices, PSIs should be cleaned as soon as possible following the procedure to prevent biofilm formation. *Note: Dried blood that is allowed to remain on an instrument for an extended period can also cause damage to the instrument's surface.*

PSI components should be carefully disassembled as instructed in the manufacturer's IFU. Failure to disassemble specific components as directed will prevent adequate, thorough cleaning. That, in turn, will lead to ineffective sterilization and increased risks to patient safety.

Objective 2: List essential precautions to take when handling PSIs

Many PSIs appear sturdy enough to withstand rough handling; however, they are complex and sometimes fragile instruments that must always be handled and processed with extreme care. Each device contains internal components that can be damaged by improper handling. That damage may not be evident until the instrument is in use, which can negatively impact the effectiveness of the procedure and the safety of the patient.

There are other issues to consider when handling PSIs. Perhaps the most concerning is exposure to liquids. PSIs must never be immersed in liquid (water or cleaning solutions) because there are openings where liquid can invade the instrument. Not only will that make the instrument impossible to clean and sterilize, but it can also cause extreme damage to its internal components.

Handpiece cleaning should be performed without immersing it. If the IFU states that the handpiece can be placed under running water (clearly check the IFU!), using a decontamination battery or hose can help protect the water from accidentally entering the connector area. To reduce the risk of fluid invasion, solutions may be wiped from the device using a dampened, lint-free cloth. Figure 1 shows the internal components of a handpiece that has been exposed to fluid invasion. Note the corrosion, debris and discoloration of the internal components. This unit must be removed from service and sent for repair (in some cases, replacement might be necessary).

There may also be some accessories that cannot be immersed. To prevent errors and damage, always check the IFU before beginning the process and clean the accessories in strict accordance with the instructions. Again, never assume that all cleaning instructions are the same.

Many PSIs require lubrication. It is essential only to use the recommended lubricant and apply it according to the IFU. Using the wrong lubricant or applying it incorrectly can damage the instrument and its working components.

Following these basic precautions correctly and consistently can prevent avoidable damage, save money on preventable repairs and replacements, and avoid adverse patient outcomes.

Objective 3: List strategies for staying abreast of PSI processes and current information

The first steps in preparing to process PSIs are ensuring a complete understanding of the specific device's IFU and providing hands-on training for the device. Having thorough knowledge about the required processes is the starting point for successful PSI handling. Training should include competency completion specific to the instrument being processed. Competencies are more than just some required paperwork. Each technician should treat competency as a specific milestone in preparing PSIs for patient use.

The powered surgical instrument segment continues to advance and evolve. Technicians must stay abreast of changes to devices and processing information. They should also work to learn as much as possible about the PSI system. That may include becoming familiar with sending and receiving repair shipments, learning more about disposable components, or serving in a training capacity when new employees are introduced to the department. Additional education can be obtained by the PSI manufacturers, as many offer educational programs and materials. Every SP professional should aim to

Figure 1

become an expert on the PSIs in their facilities inventory, as well as their accessories and IFU.

Conclusion

The PSI segment continues to advance and evolve as new medical and surgical needs are identified. SP professionals must be aware of the processing requirements for each PSI at their facility and remain vigilant as they carry out each step of the process. Failure to do so can put patients in danger, contribute to customer dissatisfaction and lead to instrument damage and premature replacement.

RESOURCES

HSPA. *Sterile Processing Instrument Manual*, second ed. 2025.

HSPA. *Sterile Processing Technical Manual*, ninth ed. 2023.

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Casey, V.J., McNamara, L.M. "Instrumental in Surgery: A Narrative Review on Energy-based Surgical Cutting Devices and Surgical Smoke." Ann Surg. Sept. 1, 2023;278(3):e457-e465. Epub 2023 Feb 10. PMID: 36762559; PMCID: PMC10414159

CIS Self-Study Lesson Plan Quiz: Cleaning, Handling & Care of Powered Surgical Instruments

Lesson No. CIS 313 (Instrument Continuing Education – ICE) · Lesson expires December 2028

1. What is the main reason for completing a competency?
   a. To fulfill accreditation agency requirements
   b. To meet state health department requirements
   c. To increase patient safety
   d. To complete the steps to obtain a pay increase

2. Powered surgical instruments (PSIs) are not appropriate for use in neurosurgery and dental procedures.
   a. True
   b. False

3. The design of a PSI is often driven by:
   a. Cost and time limitations
   b. User input and need
   c. Regulatory requirements
   d. Availability of materials

4. PSIs are especially vulnerable to:
   a. Heat
   b. Cold
   c. Lubricant contamination
   d. Fluid invasion

5. Powered devices are used primarily for orthopedic procedures.
   a. True
   b. False

6. Point-of-use treatment for PSIs:
   a. Should be performed by those in procedural areas
   b. Should be completed by the lead processing technician
   c. Is a state requirement
   d. Is only necessary for orthopedic surgery

7. The best resource for PSI processing details is:
   a. The Association for the Advancement of Medical Instrumentation (AAMI)
   b. The U.S. Food and Drug Administration (FDA)
   c. The instructions for use (IFU)
   d. The Sterile Processing department's policies and procedures

8. Allowing blood and soil to dry on PSIs:
   a. Increases the risk of biofilm formation
   b. Is unavoidable in most procedures where PSI are used
   c. Will result in the need to replace plastic components
   d. Is a normal part of the PSI use cycle

9. PSI handpieces:
   a. Are usually fluid-resistant
   b. Should not be immersed
   c. Should be disassembled and inspected carefully before immersion
   d. Have batteries that must be removed before immersion

10. Failure to follow PSI manufacturers' IFU:
   a. Is not problematic because the devices are easy to clean
   b. Should result in technician termination
   c. Requires immediate manufacturer intervention
   d. None of the above

11. Which of the following statements is **not** correct?
   a. Cleaning processes for PSIs are standardized
   b. PSI is a general term used for a group of powered surgical instruments
   c. PSIs should not be immersed
   d. Cleaning procedures for PSIs are outlined in the instrument's IFU

12. Which of the following statements is correct?
   a. Experienced technicians rarely need training when new PSIs are introduced
   b. PSI training should include the completion of a competency document
   c. PSI configuration has not changed significantly since its introduction
   d. PSI internal components are housed within a waterproof shell

13. Pneumatic-powered PSIs feature an immersible battery for back-up power.
   a. True
   b. False

14. Which is a precaution to reduce the risk of PSI fluid invasion?
   a. Wiping cleaning solution from the PSI with a damp, lint-free cloth
   b. Placing the PSI into a warm sterilizer for drying
   c. Avoiding liquids in all phases of PSI cleaning
   d. Covering all openings with a medical-grade plastic

15. The first steps in preparing to process PSIs are:
   a. Becoming a Certified Instrument Specialist and completing vendor-provided competencies
   b. Ensuring complete understanding of the specific device's IFU and undergoing hands-on training for the device
   c. Observing procedures where PSIs are used and completing a competency
   d. Performing point-of-use treatment in the decontamination area under the manager's supervision

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