Back to Basics:

Instrument Inspection for the Instrument Specialist

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LEARNING OBJECTIVES

1. Discuss the importance of accurate instrument inspection and assembly
2. Review basic instrument inspection processes
3. Review instrument maintenance practices

Instrument inspection is one of the critical tasks for which Sterile Processing (SP) technicians are responsible. For some SP departments (SPDs), instrument processing is their only focus; other facilities' SPDs, however, are responsible for additional tasks, such as management of case carts, supply inventory and durable medical equipment. Regardless of the assigned tasks, every SPD is busier today than in the past. This is partially due to the number of new medical devices being introduced and the complexity of those devices. This lesson reviews basic processes for instrument inspection, assembly and maintenance.

Objective 1: Discuss the importance of accurate instrument inspection and assembly

Many facilities have experienced labor freezes, cutbacks or a higher volume of procedures without adding staff. Regardless, it is important for all healthcare workers, including SP professionals, to remember that basic procedures do not change just because they are busier, or their resources are more thinly stretched. Instrument inspection is one such process that cannot be rushed or overlooked.

Basic instrument inspection processes apply to all types of instruments, regardless of their complexity. Giving in to the pressure of a rapid turnover of instruments or sets jeopardizes both staff and patient safety. Further, failure to diligently check for soil and debris can cause an unsterile instrument or set to be used on a patient, if the debris is not noticed in the procedure area before the case begins. This can potentially cause a surgical site infection (SSI) or worse. When an instrument is not properly assembled or its function is not checked, a physician may attempt to use a non-functional instrument that can harm the patient, physician or both.

Unsharpened scissors and improperly functioning forceps and graspers, for example, can cause tissue damage in the patient, which can increase recovery time and lead to an infection. Improperly inspected needle holders

may allow a needle to slip into a surgical site and cause delays while the surgical team tries to locate the needle before it can cause harm. A soiled or clogged lumen may introduce debris into a patient and prevent the surgical team from clearing the surgical site, thereby impeding the surgeon's vision or causing the patient to bleed longer than necessary.

Failure to take enough time to string instruments correctly, protect sharp instruments or keep small parts close to the instrument in which they belong, or include all instruments on a count sheet can lead to devastating consequences during a procedure. It is vital that instrument assemblers always remember and apply the basic principles of instrument inspection and assembly.

Objective 2: Review basic instrument inspection processes

Instrument inspection should begin as soon as a technician receives a tray from the decontamination area. When an instrument or set is selected for assembly, technicians should observe the overall condition of the instrument or set while on the way to the preparation table. If the tray looks overcrowded or heavy items are placed on top of more delicate items, there is a greater risk of instruments becoming damaged or soiled. Poor decontamination practices should be documented and reported to the appropriate person; such practices can be harmful to patients, physicians and other staff and prove costly to the facility.

When watching an experienced instrument technician inspect instruments, it may appear that the process is simple and easy, but it is not. Instrument inspection is a detailed, technical and multistep process. There are many steps to the inspection process, including:

Verifying cleanliness. Once the instrument or set is selected, cleanliness testing [using a commercially prepared adenosine triphosphate (ATP) or protein-based product] should be performed according to facility policy. Some facilities require testing of a few instruments from each tray, while others follow random sampling. If soil is found, the entire tray of instruments should be sent back to the decontamination area for re-cleaning, because the entire tray is considered contaminated. Positive and negative test results should be carefully documented.

Lumened instruments and items with small crevices should be inspected. The use of a properly sized borescope is helpful with this process. This includes not only suction devices but flexible, semi-flexible and rigid endoscopes and many orthopedic items, such as cannulated screwdrivers, arthroscopes, power equipment and phacoemulsification handpieces. Again, soiled lumened instruments—and other instruments in the tray with which they were processed—should be returned to the decontamination area for recleaning. *Note: It is important to clean every borescope after each use following the manufacturer's instructions for use (IFU).*

Drying. Unless otherwise stated in its IFU, each instrument should be completely dried. Wet instruments will change the wet-dry ratio in the sterilizer causing an unusable load of instruments that will require reprocessing. Reusable tray liners (e.g., silicone mats) must also be dried completely. Additionally, wet instruments will rust and can also contribute to mineral damage and staining.

Instrument inspection. Lighted magnification should be used to carefully check each part of every instrument and verify functionality. Inspection guidelines for various components are as follows:

Serrations—Carefully check all serrations for cleanliness and alignment. Close the instrument and confirm that the serrations are aligned to allow the instrument to completely close from the tip of the jaw to the serrations' end toward the middle of the instrument or at the hinge (box lock).

Teeth—All teeth should be present, and the tips of the instrument should fit together smoothly. Carefully check that the tips of the teeth are intact and not damaged; damaged tips can cause unnecessary tissue damage during a procedure. If the teeth do not fit together or tooth damage is present, remove the instrument from service and send it out for repair. Do not try to realign the instrument as it may further damage the device.

Fine-tipped instruments—Some instruments, including fine Adson forceps, towel clips and jewelers forceps, are easily damaged or misaligned. The teeth of forceps and the distal prongs of towel clips frequently have damage at their tips. All fine-tipped instruments should be carefully closed to ensure they align correctly. All tips and hinges should be intact, and the ratchets checked for proper functionality.

Hinges/box locks—Soil left in the hinge/box lock area can create a patient safety issue and cause rust to form. Debris can also cause a device's open and close function to become rough and may prevent the instrument from closing properly. Carefully check this area with the instrument in different positions of opening and closing. Also, diligently inspect the area around the hinge for stress cracks. When stress cracks are noted, remove the instrument from service, as it may break when pressure is applied during a procedure.

Small crevices—All crevices must be carefully checked for cleanliness. If a crevice is not originally a part of the device, it is an indicator of damage. Pull the device from service and send it for repair.

Ratchets and locks—Test each ratchet and lock per the manufacturer's IFU. Malfunctioning ratchets and locks can loosen during a procedure, obstructing the physician's view of the wound or releasing a vessel and blocking the field with blood.

Instrument sharpness—Scissors and other sharp instruments, including curettes, chisels, rongeurs and biopsy punches, should be checked to ensure they are sharp every time they are processed. Dull instruments will tear tissue rather than cut it, causing a longer recovery time for the patient and potentially leading to an infection from the tissue damage. Follow the manufacturer's IFU for the proper way to test each device's sharpness, ensuring the correct testing material is used for each instrument type and size. Remove all dull devices from service and send them out for repair.

Needle holders—Carefully check the insert area of each needle holder to confirm that the insert is intact, with no smooth areas. Cracked inserts can dislodge during a procedure and potentially be introduced into the patient's surgical site. Further, smooth areas will not properly grip a needle and can cause the needle to fall into a patient. Always follow the specific needle holder's IFU for the proper way to inspect the jaw area. Remove defective needle holders from service and send out for repair.

Marking systems—Every type of marking system—tape, nylon coating or etching—should be carefully inspected. *Note: Instruments with damaged tape or coating give microorganisms a place to hide from cleaning, disinfecting and sterilizing agents.*

- Tape—Carefully inspect for any indication of dryness, flaking, peeling, puckering or discoloring. If any of these issues are seen, the tape should be completely removed and reapplied following the manufacturer's IFU.
- Nylon-coated or nylon-dipped instruments—Check the entire coated surface for scratches and nicks. If any damage or wear is noted, remove the instrument from service and send for recoating.
- Etching systems (laser, electrochemical etching, etc.)—Verify that the information is still legible. Information may become illegible from use or refurbishment. When this occurs, the instrument should be removed from service and relabeled. Items labeled with an impact etcher and subsequently showing wear should be removed from service; this labeling method scratches through the protective surface of the instrument and causes it to rust and pit.

Insulation—All insulated instruments, including insulated forceps and scissors and insulated laparoscopic, robotic and neurologic instruments, should be carefully inspected each time the instrument is processed. Be sure to check each device's IFU for the proper testing equipment to use and process to follow. Faulty insulation can burn or shock the physician or patient.

Cords—All cords must be carefully checked for cleanliness and function. Many cords are dark in color, which makes it more difficult to see blood and body fluids. Using a dampened, low-lint cloth, carefully wipe the surface of the entire cord. If debris (color) transfers to the cloth, send the cord back to the decontamination area for recleaning. Check the proximal and distal ends of the cord for cleanliness and damage and inspect the entire length for nicks and cuts. As with all instrumentation, use lighted magnification to help identify any damage. Confirm the cord's functionality prior to packaging.

Demagnetization—Some devices, especially cardiovascular instruments, become magnetized during procedures. This is caused by the type of equipment used during those surgeries. It is important to check these instruments for magnetization before packaging the set. It is often easy to tell which instruments have become magnetized, as they will attract other metal devices. Demagnetizers are inexpensive devices that can be used to correct the magnetization. If a demagnetization device is not available, most repair companies will perform the process for a small fee. Never place a magnetized instrument in a set, as it may magnetize the other instruments. Needle holders that are magnetized, for example, may not release a needle when the physician is closing a wound.

Multipart instruments—Each piece of a multipart instrument must be inspected for cleanliness. The device should then be assembled to ensure all parts are available and fit together properly. Test the device's functionality, then disassemble it for disinfection or sterilization. Keep all parts of the device close together, ensuring that small pieces are contained and do not become lost.

Note: When inspecting instruments, it is essential to diligently follow each specific instrument's IFU. If a technician or department is unsure about any step, they should contact the manufacturer for clarification.

Objective 3: Review instrument maintenance practices

SP technicians should never attempt to repair an instrument unless properly trained to do so. Untrained individuals can easily damage an instrument. Bending a forceps tip back into shape, for example, may ruin the true alignment and change the tension the tips place on tissue when in use. Only allow trained professionals to maintain instruments.

The same is true for instrument sharpening. Even though instrument sharpening looks like a simple process, each instrument has its own specifications for cutting length, bevel, etc. Sharpening a scissor incorrectly will change the cut the device will make when in use. Never place a dull instrument in a set, as it can cause unnecessary tissue damage and extend the patient's recovery time. Place dull or damaged instruments in a repair bin to keep the devices out of service and prevent further damage to the instruments.

Some technicians are in the practice of dumping a tray of clean instruments onto a preparation table for sorting. This is one of the most damaging activities that can be done to an instrument. As instruments fall from the tray, they can become misaligned or bent. Tips and delicate teeth can easily become damaged. Heavier instruments on the bottom of the tray will also fall on top of more delicate instruments. Always remove instruments from trays a few at a time and carefully place them on the preparation table. This takes a little more effort, but it protects both the patient and the healthcare facility's instrument investment.

Other maintenance practices during the inspection process include checking for and using the following:

Stains, rust or water spots—It is important to pay attention to any spots or stains, as some stains can quickly damage an instrument. A stain and its cause should be carefully investigated, and the issue corrected as quickly as possible to avoid further damage to instruments. Removing stained instruments, especially those with rust, from service and placing them in the appropriate repair bin will extend the life of that instrument. Often, stained devices can be refurbished and returned to service.

Tray and inner tray—Always inspect the tray where the instruments will be placed. Broken wires or dented edges can damage instruments.

Stringers—Ensure stringers are in good repair and will hold the instruments in place. Damaged stringers can scratch instruments. Malfunctioning stringer locks may allow instruments to fall off a stringer and move within the tray, potentially damaging the instruments.

Tray pegs—Pegs placed in trays to organize instruments should be checked to ensure they fit properly. Loose or damaged pegs can damage the tray and the instruments.

Placement—Place instruments in assembly order. This includes items on stringers and those that are placed in the tray. Arrange all curves in the same direction to avoid scratching instruments or harming staff. Avoid layering or piling instruments. Not only does this help protect the devices from damage, but it also makes it easier for staff to find the instruments they need.

Instrument protectors—Use approved instrument protectors to help protect sharp and delicate instruments.

Heavy instruments—Place heavy instruments at the bottom of the tray to keep more delicate instruments from being damaged by larger, heavier devices.

Disassembled instruments—Keep the parts of disassembled instruments in close proximity to prevent users from piling instruments while looking for needed parts. Small pieces, such as screws, should be placed in approved holding containers to prevent them from being lost or damaged.

Incomplete sets or missing instruments—Sets with missing instruments must be corrected; they can create frustration and additional work and can lead to unnecessary wear on or damage to instruments. Incomplete trays will need to be reprocessed (even if unused) when users open the tray and then have to open another tray to locate a missing instrument(s).

Conclusion

Instrumentation is expensive, and premature replacement and repairs only add to the financial investment incurred by a healthcare facility. Careful inspection and meticulous care of this investment is a primary responsibility of every SP technician.