

# QUALITY PREPARATION OF SURGICAL INSTRUMENTS

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## BACKGROUND

Surgical instruments must be thoroughly cleaned, properly assembled, carefully inspected and tested, correctly packaged and effectively sterilized to ensure patient safety and positive patient outcomes.

The outcome of a surgical procedure can be affected if the instruments are not present or functioning as intended. An Operating Room's efficiency is adversely affected when there are issues associated with surgical instruments. Room turnover time can be delayed if an instrument:

- or component is missing
- does not function as intended (e.g. scissors do not cut)
- is not clean
- is damaged/broken (e.g. tips do not approximate on finger forceps).

All of the above scenarios would require the circulating nurse to leave the OR room to obtain replacements (which may not be readily available!). Sometimes, there are no back-up instruments and a substitute instrument is used. The substitute may alter the surgery outcome or add time to the case. This may cause the patient to be exposed to anesthesia for a longer period of time than necessary. Problems of this nature are unacceptable to the surgeon, the surgical team and the patient. Moreover, in a majority of the instances, these problems are preventable!

To reduce instances of surgical instrument problems, this inservice will describe the best practices for preparation of surgical instruments.

## WHERE IT STARTS

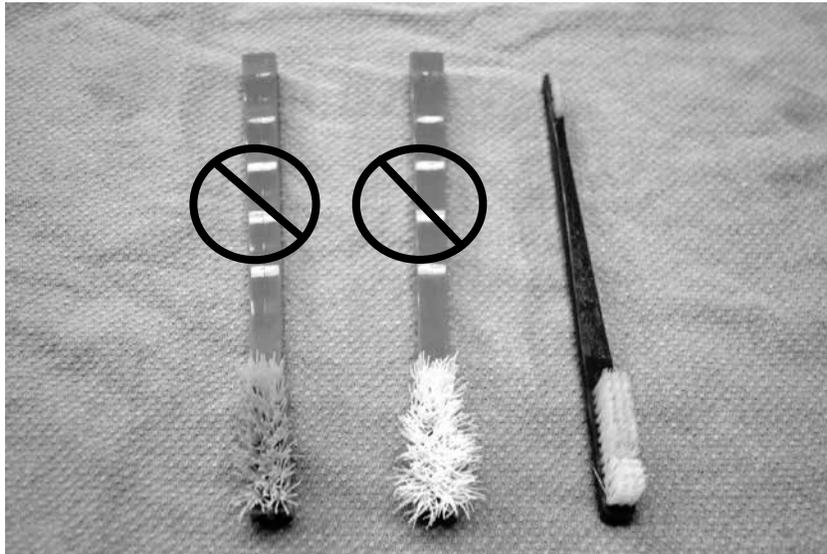
Before any device or surgical instrument is **ordered**, from a manufacturer, obtain the written instructions for processing. This information should include detailed information on disassembly, cleaning (including equipment and detergents to be used), testing, packaging and sterilization methodologies.

Verify that your facility has the recommended equipment to clean and sterilize the instruments and the recommended chemicals for cleaning/disinfection. If not, you should not purchase the devices or get approval to purchase the needed equipment. For example, the manufacturer of an endoscopic forceps recommends ultrasonic cleaning but your facility does not have an ultrasonic cleaner. You would be modifying the device manufacturer's instructions for cleaning if you did not use an ultrasonic cleaner! The manufacturer tested and validated the cleaning process using ultrasonics. Non-compliance could result in an unclean instrument and may adversely affect the performance and longevity of the device.

## DECONTAMINATION

The detergents used in cleaning are important to remove visible and invisible soil (microorganisms) and to prepare the device for disinfection or sterilization. The recommended detergents should be used **and** the end user should carefully follow the detergent manufacturer's instructions for measuring the detergents as well as the recommended water temperature. This is especially critical with enzymatic detergents which can be inactivated in temperatures above 140°F. The effectiveness of the cleaning process can be adversely affected when detergents are not used properly. The water temperature should be monitored to ensure the water temperature does not exceed the manufacturer's instructions.

Proper cleaning implements are also essential – especially when cleaning small lumens (channels). It is important to clean all surfaces of the instrument/device. To do this, some disassembly may be required. Follow the device manufacturer's instructions for disassembly and take care to keep all components together to avoid loss. You should always use the correct size brush (correct length and diameter – especially for cleaning lumens). Reusable cleaning brushes should be cleaned and disinfected or sterilized (if recommended) at least each shift. The condition of the brush bristles should be checked regularly. Any brushes with bent, missing or distorted bristles should not be used.



### **THE BRUSH ON THE LEFT AND IN THE CENTER ARE NOT ACCEPTABLE FOR USE**

Many devices require manual cleaning (delicate items), some are not immersible (e.g. power equipment). If cleaning by hand, always wash the device below the water level to prevent aerosolization of bacteria. If using a mechanical washer, do not overload the washer. Make sure all items have direct exposure to the water/detergent. Do not place bowls/basins over instruments to keep a set together.

Rinsing off debris and detergents is the final step in cleaning. It is preferable to rinse under running water to permit the detergent residues and debris to flow down the drain. Some instrument manufacturers recommend a final rinse with treated water (e.g. distilled, reverse osmosis, etc.). Thorough rinsing of all the detergent residue is essential; it can interfere with the sterilization process. You should rinse the instruments after each step in the process; after the enzyme pre-soak, after sonic cleaning (if manually processing instruments).

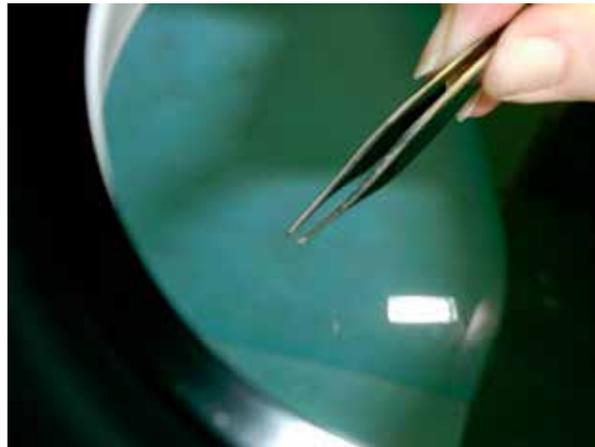
## PREPARATION/PACKAGING

Most instrument manufacturers recommend a water soluble lubricant (often called instrument milk) be applied after cleaning and before sterilization. This process should be performed in the prep and packaging area (clean area) to avoid contamination of the lubricant solution. If a mechanical washer is used, many offer a lubrication cycle. Always follow the lubricant manufacturer's instructions for dilution (e.g. mix with sterile distilled water rather than tap water), use life (can be anywhere from 24 hours to 14 days) and compatibility with steam, ethylene oxide gas (ETO) and low temperature gas plasma processes. It is recommended to note the date the lubricant needs to be changed on the lid of the container of instrument milk. The lubricant should be allowed to air dry; do not rinse off, or use towels to dry or the lubricant will be removed.

Harsh chemicals such as saline and bleach should be avoided to prevent damage and corrosion to instruments. Only use the chemicals recommended by the device manufacturer.

Inspection of instruments should be performed using a lighted magnifying lamp to help identify quality issues. Examine the instruments for:

- Cleanliness – especially in the joint (box lock), serrations and ratchets.
- Completeness – for multi-part devices, verify that all parts are present.
- Functionality – inspect/test the instrument for:
  - stiffness in the joint
  - sharpness
  - tips of finger forceps approximate (SEE PHOTO BELOW)
  - ratchets hold
  - jaws of needle holder hold a suture needle
    - a) condition of instrument marking tape or “dipped” covering
    - b) integrity of insulation.



**Using lighted magnifying lamp to check tips meet on Adson forceps**

The inspection process for cleanliness must occur each time. When processing Orthopedic loaner sets, make sure to lift up each instrument; look underneath for bone fragments that can accumulate during surgery. Any instruments that are not clean should be returned to the Decontamination Area. Cleaning is not to be performed in the prep/packaging area. When an instrument is stiff in the joint, this is an indication of debris in the joint; over time the joint will fail (cracked box lock). (SEE PHOTO BELOW)



A scissors that does not cut does not belong in an OR. Every scissors should be tested each time before placing on a set. Use of a piece of tissue simulating product (latex or non-latex type) to test for sharpness. Make sure you use the correct thickness of latex product. The thicker product should be used to test large scissors (scissors 4.5 inches or longer in length); the thinner product should be used to test smaller scissors (scissors 3 to 4 inches in length). Two or three cuts should be made through the testing product, using the distal third of the blade of the scissors. If the scissors cannot cleanly cut through the material or if it snags the material, the scissors should be removed from the instrument set and repaired.

To test if the ratchets will hold, close the instrument on the first ratchet and then gently tap on the edge of the table. If the ratchet opens, the instrument should be sent for repair. (SEE PHOTO BELOW)  
Instrument marking tape or instruments that have been “dipped” into a chemical for color coding need to be inspected to make sure the tape or dipping is in good condition. These products can flake off in the surgical field and enter the patient’s incision. If either of these methods is used to identify sets, they must be routinely replaced.



**Testing if ratchets will hold**

The integrity of insulation on insulated (e.g. laparoscopic) instruments is essential to prevent patient injury. All insulated instruments should be visually inspected for breaks in the integrity of the insulation. This is best visualized using a lighted magnifying glass. However, this is just the first inspection because

some defects cannot be detected visually. Therefore it is recommended to perform insulation testing using a device specifically designed for this purpose. There are several on the market. Evaluate the performance, ease of use, cost and capability of the tester. Some units can also test cables and cords which is also desirable.

The insulation should be tested each time the instruments are processed to avoid possible injury to the patient and/or surgical team. Results of the insulation testing should be documented in a log form and the records saved with the sterilization records. For example, the date the set was tested, who tested it, how many instruments were tested, the name and/or catalog number of each instrument tested, if the instrument passed or failed the test and if it failed, what action you took (e.g. removed from set and sent for repair).

Any instrument that does not meet the performance criteria should be placed in a designated location for repair. A quality repair service is recommended to keep instruments working properly. It is also recommended to include preventive maintenance of all sharps.

Refer to the instrument manufacturer's instructions for use to determine if the instrument can be sterilized assembled. For example, laparoscopic forceps with inserts may need to be sterilized disassembled. Failure to do so could adversely affect the sterility of the device.

Instruments should be packaged based upon the use of the device, the anticipated handling and the recommended sterilization process.

## **TRAY ASSEMBLY**

When assembling sets always follow the count sheet or "recipe card" to make sure the correct instrument is placed on the set and the correct quantity. Today, some facilities use instrument tracking forms or count sheet programs. Regardless of the method, to prevent errors, enter the count on the count sheet or in the computer AFTER the instrument has been placed on the set. Do not enter the counts after the set is assembled—errors can be made.

Instruments should not be substituted without the approval of the OR. Missing instruments should be documented and the OR consulted to see if the set can be completed without the missing instrument(s).

Use tip protectors to protect sharp or delicate instruments. All instruments with finger rings should be placed on a stringer—the stringer should be wide enough to permit the jaws of the instruments to remain open to make contact with the sterilant. Do not use any type of packaging material inside the set (wrapped or container). If instruments must be separated (e.g. forceps), you can use an autoclaveable bag that has been validated for use inside a wrapped set or rigid container, a lint free surgical towel or a disposable tray liner.

When labeling sets, it is important to label the set correctly. When a set is labeled incorrectly, it delays the OR and the set will have to be completely reprocessed—a waste of time and money. For wrapped sets, write the name of the tray on the autoclave tape FIRST. Then after the set is wrapped, apply the tape. For rigid containers, check the name on the container first to make sure it matches with the tray. When labeling packages, always use a permanent marker that is non-toxic. Other devices are not recommended for use.

**SUMMARY:**

Surgical Instruments represent a major financial asset to the healthcare facility. Careful attention to care, handling (especially avoiding abuse of instruments) and sterilization is essential to avoid costly replacements, enhance patient and surgeon satisfaction, reduce costs (delays in the OR) and enhance patient safety.

Develop a process for instrument preparation that includes all of the above steps and make sure it is followed at all times.

**REFERENCES:**

Association for the Advancement of Medical Instrumentation. ANSI/AAMI Comprehensive Guide to Steam Sterilization and Sterility Assurance in Health Care Facilities (ST-79), 2013.

Basics of Sterile Processing. Sterile Processing University, LLC, Fifth Edition 2013, Lebanon, NJ.

**QUIZ – PREPARATION AND PACKAGING**

Please click on the link below to take the quiz.

[https://www.spdceus.com/ceus/prep\\_and\\_packaging\\_quiz.htm](https://www.spdceus.com/ceus/prep_and_packaging_quiz.htm)

Good Luck!