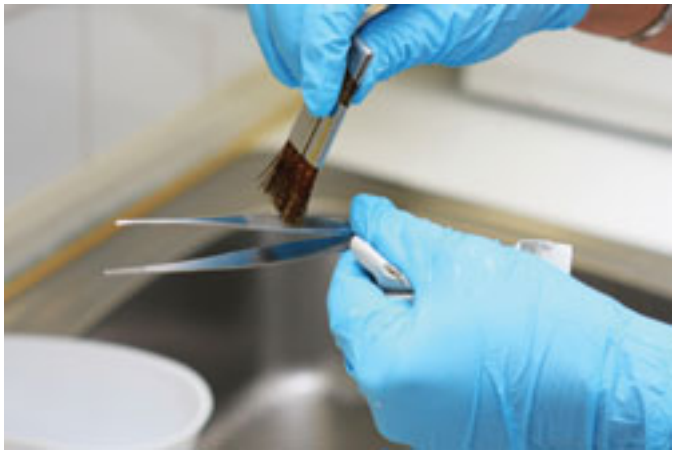
Surgical Instrument Reprocessing Basics

Marilyn M. Burns R.N., B.S., C.N.O.R.



In today's busy Operating Room setting, it is often easy to neglect the one thing surgeons and their OR team rely on most, surgical instruments. When surgical instruments are not properly cared for, the results can impact patient care as well as the facility's investment. The results of poor reprocessing techniques pose serious challenges for many health care facilities; fortunately back to basics prevention is extremely easy and effective.

Surgical steel

Surgical instruments are most commonly made from surgical stainless steel. Surgical stainless steel is actually an alloy (a mixture or solid solution of two or more metals). There are two main types of stainless steel alloys used to make surgical instruments:

1. 300 Series Stainless (Austenitic): Suitable for applications that require malleability—cannulas, retractors, probes, mallets, spreaders, suction devices.
2. 400 Series Stainless (Martensitic): Better suited for applications that require strength and sharp cutting edges—clamps, forceps, needle holders, scissors, rongeurs, needles, osteotomes and chisels.

Despite the corrosion resistant properties of stainless steel, corrosion is still possible if the instruments are not cared for properly. Corrosion can be caused by a high acid or alkaline concentration in a detergent—conditions involving high chlorides, friction, lack of lubrication, hard water conditions, manufacturing defects and other factors. It is important to note that stainless steel is actually stain-resistant not stainless or stain-free. It will stain under certain conditions. Proper care will ensure that your surgical instruments perform well, look their best and last a long time.

Passivation is a chemical process that creates a protective layer on the instrument. Passivation uses organic acids, such as nitric or citric acid, to build a protective layer of chromium oxide and make the instrument "less reactive." This layer is highly resistant to corrosion and staining and continues to build up throughout the

life of the instrument if the correct reprocessing techniques are used. Interestingly, stainless steel has the unique ability to heal itself. Much like human skin, as long as a cut or nick is cleaned properly and exposed to air; it will heal itself. With new surgical instruments the passivation layer may not initially be as strong, but it will build up over time.

Proper cleaning

Cleaning is the first and most important step in the sterilization process. Instrument cleaning should occur as soon as possible after the instruments are used in an effective and timely manner to ensure patient safety and high instrument quality. Cleaning and decontamination must be thoroughly accomplished or disinfection and sterilization may not be effective. The manufacturer's written, validated instructions for handling and reprocessing should be obtained and evaluated to determine the ability to adequately clean and reprocess the equipment within the health care facility before purchasing surgical instruments and powered equipment. Cleaning is defined as the removal—usually with a detergent and water—of both visible and non-visible soil (such as blood, proteins, bio-burden and other debris) from the surfaces, crevices, serrations, joints and lumens of instruments, devices and equipment.

Decontamination involves the use of physical or chemical procedures to remove, inactivate or destroy blood-borne pathogens on a surface of an item. This process renders the item safe for handling, use or disposal. Where instrument processing is concerned, the purpose of decontamination is to make devices safe for handling by persons who are not wearing gloves.

Ideally, surgical instrument cleaning and decontamination begins at the point of use. AORN recommends that the instruments should be wiped as needed with sterile sponges during the procedure to remove gross soil. Removing gross soil and moistening the soil at the point of use improves the efficiency and effectiveness of decontamination. Preparation for decontamination should include the following:

- Gather all instruments opened during the procedure
- Segregate sharp instruments from other instruments
- Discard disposables
- Disassemble instruments, equipment and other devices
- Box locks should be fully opened
- Flush all lumens
- Protect delicate instruments from damage
- Place lightweight instruments on top of heavier instruments
- Segregate micro-surgical instruments into separate containers for cleaning
- Process eye instruments separately

If possible instruments should be soaked or treated with an instrument treatment cleaner prior to transport according to the instrument manufacturer's recommendations. Contaminated instruments must be transported in a timely manner to a location designed for decontamination.

Contaminated surgical instruments should be transported to decontamination area as soon as possible following the procedure in a closed container clearly marked Bio-Hazard. Removal of the bio-burden becomes more difficult after it has dried and can cause continuing surface corrosion damage such as pitting and staining. It can also inhibit sterilization.

In the decontamination area, instrument cleaning can be accomplished manually, mechanically (automatic washer, ultrasonic) or by a combination of both methods. All surgical instrument and medical device or equipment manufacturer’s validated instructions should be followed regarding the typed of cleaning methods (e.g., manual, automated) to be used for decontamination.

Any device should be able to be cleaned manually. Manual cleaning is often recommended for delicate or complex instruments like lensed instruments, power drills, and micro-surgical instruments. Be sure to follow the manufacturer’s recommendation and your facility’s procedures for proper manual cleaning technique.

Mechanical or automated cleaning is an efficient and effective method of cleaning surgical instrumentation. Mechanical cleaning is not recommended for all instrumentation and devices, so consult the instrument, equipment, or device manufacturer prior to utilizing this method. Ultrasonic Cleaners are designed for fine cleaning and must be handled with extreme care. Not all metals can be mixed in the Ultrasonic during cleaning and doing so can cause serious instrument challenges.

Once the surgical instruments are clean, they will be assembled into trays and sterilized for use in the Operating Room. Inspecting the instruments before they are reassembled into sets provides an opportunity to identify any instruments that need additional cleaning, repair or replacement prior to use. Instruments should be inspected for mechanical issues such as alignment, missing parts, loose pin sets, as well as cleanliness, corrosion, proper functioning and other visible defects.

Following this inspection and any cleaning, repair or replacement needed, the set will be assembled and packaged appropriately for sterilization. By focusing on basic surgical instrument reprocessing, your valuable surgical instruments will improve their longevity and function.

Marilyn M. Burns
R.N., B.S., C.N.O.R.
Director of Clinical Affairs and Medical Education
Symmetry Surgical

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