



A Primer for Protecting Your Investment in Surgical Instruments

Official Guide: Maintaining and Cleaning Surgical Instruments



***About This Guide***

As a medical professional, you want to ensure the utmost quality and integrity of your surgical instruments at all times. You also want to protect your considerable investment in these high grade medical devices.

The cost of replacing surgical instruments is far greater than the cost of maintaining them. For this reason, a comprehensive maintenance program is extremely important. This guide, provided by Spectrum Surgical, will help.

Spectrum Surgical Instruments, Inc. is one of the nation's leading suppliers of innovative surgical instruments to many practices, hospitals and medical facilities. In keeping with the company's commitment to quality, Spectrum has developed this official guide for all industry professionals.

Proper Care and Scheduled Preventive Maintenance

Proper care of surgical instruments begins with appropriate cleaning. This guide discusses various methods of washing, sterilizing and cleaning all types of instruments. Proper care also means off-site maintenance of instruments on a regular basis for sharpening and adjusting. There is no standard schedule; maintenance will be determined by frequency of use. A general rule of thumb for busy practices is to schedule maintenance every six months. Instruments which may require more frequent sharpening and adjusting include: scissors, needleholders, bone cutters, hemostats, osteotomes, rongeurs, chisels, bone curettes, knives and punches.



Spectrum Surgical has an entire lab dedicated solely to instrument maintenance programs. The company has a quick turn-around time of 48-hours when needed and its mobile units pick-up and deliver for your convenience.

The Look and Feel of New Instruments

Most professionals will recognize that new instruments feel different. Newer devices tend to be harder, *with a stiffer feel to them*. That's because as instruments age, they soften with use and cleaning. With proper care, these devices can last a lifetime. It's important to realize, however, that even the highest grade instruments will experience at least minimal wear and softening over time. Remember, new instruments are designed to be stiff at the onset of use. The idea is to keep this wearing to a minimum with proper cleaning and a scheduled preventive maintenance program.

Enemies of Surgical Instruments

In addition to giving tips on the care and cleaning of instruments, this guide will discuss several enemies of surgical instruments. Blood, tissue and surgical residue are the primary causes of pitting, staining and discoloring of instruments. Water and moisture also have damaging effects. Allowing any of these elements to dry or soak on your instruments will cause undesirable stains. Other enemies include washing instruments with inappropriate solutions such as dish or laundry soap, bleach, disinfectants and non-approved solutions. Cold soaking also causes damage. To properly care for your instruments, it is important to use approved methods of cleaning and to understand the causes of undesirable effects such as staining. Surgical instruments are manufactured from 300 and 400 series stainless steel. *While this material rarely rusts—it does stain, despite its name*. Stains appear as an orange or brown discoloration. The idea is to ensure proper care to limit these stains.



Tip: Extend the drying cycle of your autoclave, especially when a sterilizing tray is fully loaded. This will help to reduce condensation on the instruments.

Causes of Corrosion (Staining, Pitting and Marking)

Surgical Residues

Blood, pus and other secretions contain chloride ions which lead to corrosion most often appearing as an orange-brown color. If left on the instruments for any extended period of time (1-4 hours), the instrument will mark and stain, especially if these residues are allowed to dry. Therefore, always clean and dry every instrument thoroughly after use. Only sterilize a clean instrument. The most damaging procedure is to allow dried-on debris to become baked-on stains in the autoclave. The temperature of the autoclave (250°- 270°) will cause chemical reactions that can make the stain permanent. Remember, an autoclave does not clean; it will only sterilize.

Tap Water

Even tap water can stain an instrument. Tap water contains a high concentration of minerals which can be seen as a fine deposit on the instrument surface. Rinsing with distilled water eliminates such deposits. Water with high mineral counts left to sit on an instrument can cause unattractive stains. Therefore, it is important to dry your instruments immediately and thoroughly.

Cleansers

The cleansers and cleaning agents you use could also be a cause of corrosion. Strong substances, as well as those containing a chemical make-up of acid or alkaline-based solutions can lead to pitting and staining. Wash instruments with a neutral pH soap (between 7pH - 8 pH) for optimal results. Anything higher may damage the instrument and is not necessary. Do not use Betadine, dish soap, laundry soap or surgeons hand scrub. These products will cause spotting and corrosion. Using an instrument cleaning brush is a good idea especially for jaw serrations, teeth and hinged areas.



Tip: If more time is needed, keep contaminated instruments moist so that blood, tissue and other residue do not dry on the instruments. The best way to keep your instruments moist is to place a wet towel over the instruments.

Cleaning After Surgery

The washing process should begin within 10 minutes after surgery, even if sterilization will take place much later. Washing instruments within a few minutes of surgery is your best defense for corrosion, pitting and staining.

Only use approved solutions. Non-approved solutions are any that do not specifically state, on the label, that they include surgical instruments, stainless steel and sterilization.

Approved solutions are specially designed for surgical instruments and the sterilization cycle. Their product labels will state this use.

Sterilization

All surgical instruments must be sterilized prior to surgery to prevent infection. But even sterilization can leave contaminants behind if not properly cleaned. To prevent this, sterilize instruments with the ratchets open. This allows for better steam penetration. Plus it prevents the box locks (hinge area) from cracking. If using a pan or tray, we recommend perforated. This will also enable better steam penetration and aids in more effective drying as well. For efficiency, place heavy instruments at the bottom and lighter more delicate instruments on top. If sterilizing in paper or plastic pouches, do not stack pouches on top of one another during sterilization. When possible, use a spiral metal letter holder as a standing aid. This will permit proper steam flow.



Tip: A heated tank does not significantly improve cleaning. Generally speaking, there is no measurable improvement in cleaning—or timing—when heat is applied to the solution.

Ultrasonic Cleaning

A method of cleaning that is growing in popularity is ultrasonic cleaning. This method is, by far, the most efficient and effective available today. Its ease of use and superior efficiency is quickly making ultrasonic cleaning the preferred choice for today's surgeons. In fact, ultrasonic cleaning is 16 times more efficient than hand-cleaning. Place instruments in the ultrasonic unit for 10-15 minutes and use a neutral pH solution. Here are a few more tips for ultrasonic cleaning:

- Before placing into the ultrasonic unit, clean instruments of all visible debris by gently washing them in an approved instrument cleaning solution.
- Don't mix dissimilar metals (such as aluminum and stainless) in the same cycle.
- Make sure instruments have plenty of room. Don't overload your ultrasonic cleaner.
- As with all types of cleaning, open all instruments so ratchets and box locks are fully exposed to the cleaning process.
- Upon completion of the cycle, remove instruments immediately and rinse them.
- Then, dry thoroughly with a towel ensuring that no moisture is left on the instruments.

The use of water in an ultrasonic cleaner is not recommended. A neutral pH ultrasonic cleaner, when properly mixed, effectively reduces the surface tension of the solution and increases the ultrasonic cavitation process. The solution should be changed at least daily or sooner if the solution appears dirty or murky. There is no measurable improvement in cleaning ability or cleaning time frame when heat is applied to the solution. So a heater is not a necessary feature in choosing an ultrasonic cleaner.



Tip: Before autoclaving, lubricate all instruments that have moving parts. Use surgical lubricants rather than industrial oils, as these are superior for surgical instruments.

Steam Autoclave

Most hospitals and practices use the Steam Autoclave for sterilizing instruments. If this is your method, there are a few important points to remember. First, only use distilled water for filling your sterilizer reservoir. Tap water contains minerals which will cause staining if left to stand or dry on the instrument. Second, if your autoclave has a steam line filter, clean it regularly using the manufacturer's recommendations as a minimum guide. Clean the inside chamber once a week. This will prevent build-up of scale and will allow the sterilizer to operate more efficiently. To clean the inside chamber, follow these steps:

- Turn unit off and allow chamber to cool.
- Remove trays and racks.
- Using towels, remove any water laying in the bottom of the Autoclave.
- Spray the inside walls of the unit with an approved solution (Spectrum makes a cleaner called Spectra-Clave™).
Allow the solution to stand five minutes (or as instructed on the bottle).
- Using a stiff, nylon-bristle brush, brush the inside chamber very aggressively.
- After brushing, wipe the inside clean with clean towels.
- Finally, using a moist towel, wipe the gasket clean on the inside of the door.



It is no longer recommended to use a lubricant bath because the container of lubricant solution may contain bacteria from previous instruments dipped into this bath. A lubricant spray is advised. Sprays are safer, cost less and take up less counter space as well.

Wrapping Materials, Surgical Towels and Drapes

Wrapping of surgical instruments is essential in the sterilization process. If your practice uses re-usable towels and drapes, please be certain to use as little laundry detergent as possible. Towels and drapes can retain the soap particles. During the autoclave cycle, steam passes through the fabric picking up these soap particles and depositing them to the surface of the instruments. One suggestion for preventing this is to run an extra rinse cycle to remove excess soap particles. Also if your instrument packs are coming out wet, we suggest a towel be placed inside the pack to absorb moisture.

Lubrication

One of the easiest yet most effective ways to keep instruments in excellent condition is to lubricate them after every cleaning. Proper lubrication keeps instruments from rubbing and scraping, thus preventing dulling and strain to joints and hinges. Moving parts on instruments, such as joints, box locks, ratchets, and screw joints, should be lubricated regularly. Before autoclaving, lubricate all instruments that have moving parts. Only use surgical lubricants because they are steam-penetrable.

Cold Sterilization

This is not a recommended method of disinfecting for high-quality surgical instruments. Immersing instruments for long periods of time in any solution can prove damaging. Never leave instruments in any solution for longer than 20 minutes. Do not immerse instruments with tungsten carbide inserts (gold handles) in solutions containing Benzyl Ammonium Chloride (BAC). This chemical is known to loosen the tungsten carbide.



Rust Vs. Stain

Stains can be removed whereas rust will leave permanent damage. To determine if a brown or orange discoloration is a stain or rust, use the eraser test. Rub a pencil eraser over the discoloration. If the discoloration is removed with the eraser and the metal underneath is smooth and clean, this is a stain. If a pit mark appears under the discoloration, this is corrosion or rust.

Trouble Shooting Stain Guide for Surgical Instruments

Stain color: Brown/Orange

Cause: A result of high-pH detergents, Chlorhexidine usage or improper soaking of instruments. This color stain also can be caused by soaking in tap water.

Stain color: Dark Brown

Cause: Low-pH instrument solutions. The brownish-colored film may also be caused by a malfunctioning sterilizer. Similar localized stain spots can also be a result of baked-on blood.

Stain color: Bluish Black

Cause: Reverse plating, when instruments of different metal (e.g., chrome and stainless steel) are ultrasonically processed together. Additionally, exposure to saline, blood, or potassium chloride will cause this bluish black color.

Stain color: Multicolor

Cause: Excessive heat by a localized hot spot in the sterilizer. The rainbow colored stain can be removed.

Stain color: Light and Dark-Colored Spots

Cause: Water droplets drying on the instruments. With slow evaporation, the minerals sodium, calcium, and magnesium left behind can cause this spotting.

Stain color: Bluish Gray

Cause: Liquid (cold) sterilization solutions being used beyond manufacturer's recommendations.

Stain color: Black Stains

Cause: Contact with ammonia or a solution containing ammonia.

Stain color: Gray

Cause: A liquid rust remover being used in excess of manufacturer's recommendations.

Stain color: Rust

Cause: Dried blood that has become baked on the serrated or hinged areas of surgical instruments. This organic material, once baked on, may appear dark in color. Also can be caused by soaking in tap water.

***Pakistan-Made Instruments***

These lower cost, lower quality instruments can be processed and sterilized alongside German-made instruments. However, Pakistan-made products rust quicker and this rust can damage your high-quality instruments during sterilization. Therefore, if instruments begin to breakdown (rust), remove them from the surgery pack and dispose of them immediately. Always remember, when it comes to surgical instruments, the lower the price the lower the quality.

Sharpening

Discovering in the operating room that your instruments or scissors don't make the cut would be frustrating for anyone. Precision sharpness is an absolute prerequisite for any surgical tray. The best strategy is a proactive approach with an established routine inspection and a regular sharpening maintenance program. Those instruments which require sharpening most often include: scissors, bone cutters, osteotomes, rongeurs, chisels, bone curettes, knives and punches.

Scissors Testing

Until recently, it's been difficult to gauge if scissors were performing optimally. To test them, surgeons often tried cutting a piece of material, but this yielded inconsistent results due to the variety of materials used. Today, there is a rubber-like material known as Theraband to test scissors sharpness. Medium-grade red Theraband is used for scissors measuring 4.5 inches to 12 inches in length while yellow Theraband is used for scissors measuring 3 inches to 4 inches in length. Make several complete cuts through the material, cutting all the way to the distal tip (where scissors most often dull). This test will indicate satisfactory sharpness. The scissor test material is available from Spectrum.



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Providing The Best Surgical Procedures

Proper maintenance of your surgical instruments ensures that you are providing the absolute highest quality standards during surgery.

Protecting Your Investment

A good maintenance program protects the considerable financial investment you have made in these devices. Surgical instruments can be expensive. The cost of preventive care is minimal when compared to the cost of replacing instruments.

The Spectrum Surgical Maintenance Division

At Spectrum Surgical, we have always maintained the highest standards of quality when it comes to surgical instruments. We've been supplying quality, German-made instruments to the industry for more than 20 years.

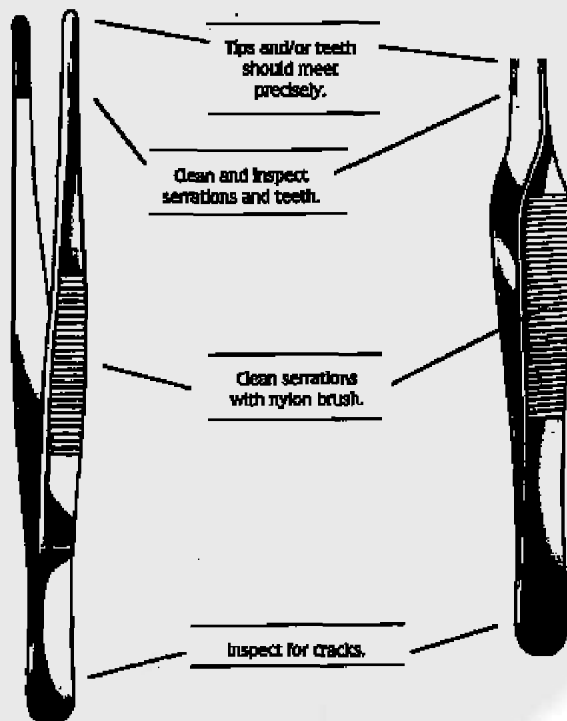
The same commitment to quality extends to our full-service Maintenance and Repair Division. With highly trained technicians and our educated customer service staff, we provide the best service possible. We can answer your questions, make recommendations and deliver your renewed instruments back within days. And all of our work is backed by our 100% satisfaction guarantee.

Speaker Services

Spectrum Surgical Instruments recognizes the importance of education in this field. That's why we provide speakers and seminars across the country. To arrange a speaker or for more information call 1-800-444-5644.



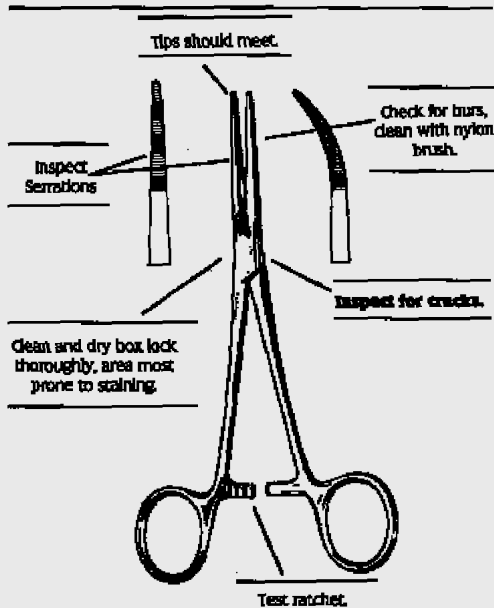
FORCEPS



Cleaning Brush Selection: Order No. M-16 or 8168N



HEMOSTATS



Cleaning Brush Selection:

Order No. P8138N, M-16, P8138S or 45-918



NEEDLE HOLDER #1

Check jaws for burs, worn edges or cracked or missing carbide inserts.

Jaws should close totally, inspect for wear.

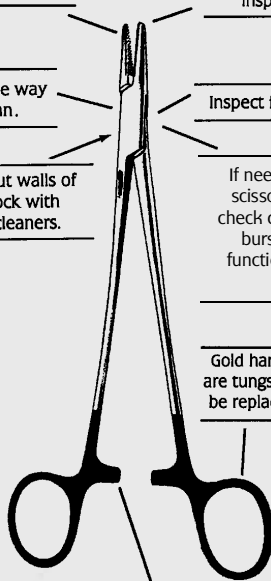
Open all the way to clean.

Inspect for cracks.

Clean out walls of box lock with pipe cleaners.

If needleholder has a scissor (Olsenhegar), check cutting blades for burs. Test scissors function with piece of suture.

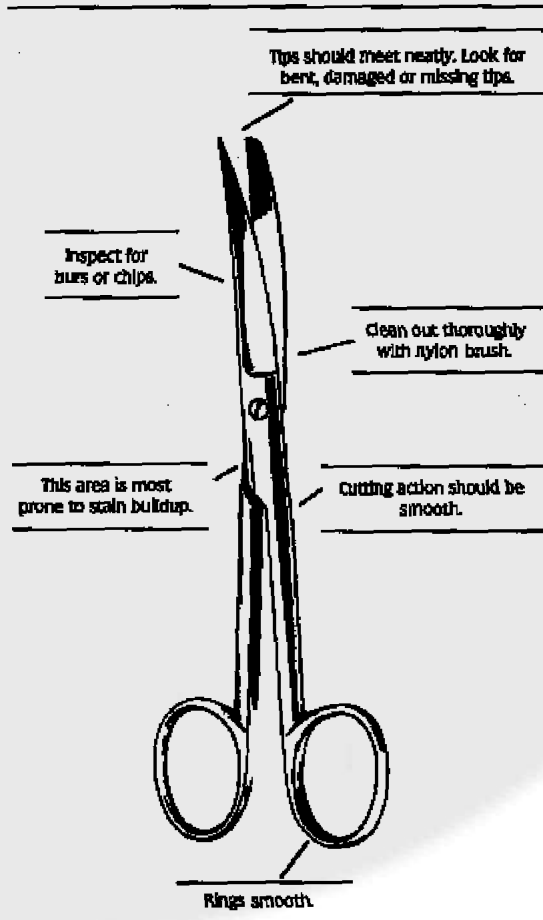
Gold handles indicate jaws are tungsten carbide and can be replaced when worn out.



Test ratchet.



SCISSORS



Resources

For your convenience, here are more resources you may want to consult regarding surgical instruments:

Codman, Schurtleff. The Care and Handling of Surgical Instruments, 1981.

Gregory B. Orthopedic Surgery, St. Louis, Mo. Mosby Publishing Co., Inc; 1994

Storz Instruments. The Care and Handling of Surgical Instruments. St. Louis, Mo: Storz Instruments, 1991

Tighe SM. Instrumentation for the Operating Room. St. Louis, Mo: Mosby Publishing Co, Inc; 1994

Working Group Instrument Preparation. Proper Maintenance of Instruments. Germany: Working Group Instrument Preparation, 1993

Reichert, Marimargaret and Young, Jack. Sterilization Technology for the Health Care Facility, Second Edition. Aspen Publishers, Inc., 1997



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