



# Do Your Surgical Instruments Look Ugly?

**J**UST LIKE A NEW CAR, SURGICAL instruments are only new for one day. Even the finest quality surgical instruments (those made in Germany) may show water spots and mild staining shortly after being placed into service. More serious issues may occur if the instruments are exposed to certain “enemies.” The following “enemies” of surgical instruments can cause staining and unrepairable corrosion (pitting/rusting) on the instruments:

- Allowing blood to dry on instruments;
- Allowing water to dry on instruments;
- Soaking instruments in saline;
- Soaking instruments in water;
- Subjecting instruments to poor steam quality;
- Subjecting instruments to poor water quality;
- Cleaning instruments with improper solutions such as dish soap, general disinfectants and chlorhexidine-based solutions; and/or
- Ultrasonically cleaning dissimilar metals together.

## 300 SERIES VS. 400 SERIES STAINLESS STEEL

It is often assumed that 300 series stainless steel, which is used to manufacture some non-cutting instruments and malleable instruments (e.g., ribbon retractors, probes and suction tubes), will stain more

easily than 400 series instruments (e.g., scissors, rongeurs, osteotomes); however, this assumption is false. The “enemies” of surgical instruments affect both 300 and 400 series metals equally. Every hospital’s instrument inventory contains 300 and 400 series stainless steel instruments.

## POST-OPERATIVE CARE

Immediately following (within 10 to 20 minutes) any surgical procedure, the Operating Room (OR) staff should wipe off gross contaminants from all surgical instruments. The more soil that is removed from the instrument in the operating room, the faster more efficient decontamination occurs. The decontamination process must begin quickly to prevent blood from drying onto the instruments. Dried blood is one of the major “enemies” of surgical instruments. Once blood dries, it is more difficult to remove and reduces productivity during the decontamination process.

After removing gross soil from instruments, the International Association of Healthcare Central Service Materiel Management’s (IAHCSMM’s) Central Service Technical Manual, Eighth Edition, states that hinged instruments should be opened, multi-part instruments should be disassembled, and instruments should be placed in the appropriate instrument tray

in an orderly manner.

ANSI/AAMI ST79, *Comprehensive guide to steam sterilization and sterility assurance in health care facilities*, states that after pre-cleaning at the point of use, personnel should:

- a) Place instruments into their respective containers, instrument pans or other transportation pans to prevent damage to the instrumentation;
- b) Have a process in place to identify instruments in need of repair/maintenance and removal from service (e.g., a tag);
- c) Protect delicate instruments from damage;
- d) Segregate reusable sharp instruments inside the container; and
- e) Place heavy instrumentation on the bottom and lighter, delicate instruments on top.

The next step is to apply a spray-on moisturizer or enzymatic solution to prevent blood from drying. (See **Image A**) If these solutions are not available, a lint-free towel should be saturated with tap water and placed over the instruments. (See **Image B**) *Note: Never soak instruments in saline. Saline will damage the instruments (See **Image E**) and most instrument manufacturers’ warranties will not cover this damage. During the surgical procedure, use saline as clinically directed.*



**Image 1:** Following their use, instruments should be sprayed with a moisturizer or enzymatic solution.



**Image 2:** If an enzymatic is unavailable, a moist, lint-free towel can be placed over instruments to keep blood/bioburden from drying.



**Image 3:** Needle holder corroded from being soaked in saline



**Image 4:** An eraser can help determine whether discoloration is a stain or rust.



**Image 5:** Discoloration is a stain when it can be removed with an eraser and the metal underneath is smooth/clean.

## RUSTED OR STAINED INSTRUMENTS

Stains can be removed, but some forms of rust will leave permanent pitting damage on instruments. To determine whether a brown/orange discoloration on an instrument is a stain or rust, the eraser test should be performed by simply rubbing a pencil eraser over the discoloration. (See **Image C**) If the discoloration is removed and the surface metal underneath the discoloration is smooth and clean, it is a stain. (See **Image D**) Staining can be removed by a repair vendor as part of the surgical instrument refurbishing process. If the discoloration is removed with the pencil eraser and a pit mark appears, this is corrosion and the instrument will continue to rust.

## SURGICAL INSTRUMENT STAIN IDENTIFICATION GUIDE

*Note: Many of the following stains can be the result of poor steam quality or poor water quality. It is important to determine whether these symptoms are occurring before or after sterilization.*

**Brown/Orange/Red Stains** – Most of these stains are not rust. This staining is the result of high-pH surface deposits caused by chlorhexidine, improper cleaning chemistries, baked-on blood, iodine or, possibly, mineral deposits.

**Dark Brown/Black Stains** – These are low-pH (less than 6) acid stains. Such stains may be caused by using improper detergents and cleaning chemistries, and/or dried blood.

**Bluish-Black Stains** – These stains indicate reverse plating, which may occur when different metals are ultrasonically processed together. For example, stainless instruments processed with chrome instruments will cause this color reaction. Exposure to saline, blood or potassium chloride will also cause this stain color.

**Multicolor Stains** – These stains may be caused by excessive heat from a localized “hot spot” in the processing cycle or from boiler additives known as neutralizing amines (corrosion preventer for steam lines).

**Light, White and Dark Spots** – Allowing instruments to air dry may result in water spots. In the presence of slow evaporation, minerals in the water are left on the





instrument's surface. High water hardness will also leave stains.

Once the source of the instrument staining is determined, the source should be eliminated. Affected instruments should then be sent to an instrument repair vendor for refurbishing (again, stains can be removed, but rust cannot). Refurbishing is performed using either a high-speed buffing wheel or a chemical instrument refurbishing bath. Eliminating the staining source, as well as placing the instruments on a scheduled preventative maintenance program, will reduce the likelihood of issues/problems recurring in the future. **C**

### **Q** I heard putting tungsten carbide needle holders into an ultrasonic machine causes the inserts to fall out. Is this true?

**A** This is false. Ultrasonic cleaning is great for tungsten carbide inserts; it will help remove blood and debris from the needle holder. On a similar subject, it is also a myth that sterilization dulls scissor blades. Years ago, this occurred in cases where steam quality was very poor and steam filters were not present in sterilizers. This resulted in "dirty" steam leaving deposits on the blades, which caused dullness. There are no issues with today's modern sterilizers.



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