



Akhyar Surgical Professionals

Care of Surgical Instruments

Surgical Instruments are expensive and the cost of preventative care is minimal when compared to the cost of replacing instruments.

Below are some of the points to consider regarding surgical instruments care and maintenance.

- Generally instruments are made from stainless steel. Stainless steel contains nickel and chromium. A small percentage of the population is known to be allergic to these metals. If an allergic reaction occurs, direct patient to consult physician.
- Before cutting/using wire, place gauze or cotton roll next to wire end to prevent scrape of wire fragments.
- If instruments are supplied non sterile, it should be cleaned and sterilized before every use.
- Only use the instrument for its intended purpose. Only qualified persons should use the instrument.
- Before sending instruments back to manufacturer for maintenance, repair or any other reason, it should be cleaned and sterilized and cover the sharp edges or points with protective cap.

Handling New Instruments

New instruments and those returned from repair must be removed from their transportation packaging before storing or inclusion in the instruments usage and processing cycle.

Any protective caps or cover should be removed.

Brand new and repaired instruments must be sent through the entire processing cycle in the same manner as used instruments.

You should not skip cleaning step because residues (ex; from packing materials or care agent) could lead to formation of stains or deposits during sterilization.

Always check cleaning results by visual inspection.

Brand new instruments and instruments returned from repair should be only stored in their original packing at room temperature in dry, clean and dark rooms. Condensate may build up inside plastic packages as a result of temperature fluctuations that might cause corrosion damage.

Microsurgical instruments should be stored in suitable racks.



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Causes of Corrosion (Staining, Pitting, and Marking)

Generally, surgical instruments are manufactured from 300 and 400 series stainless steel. While this material rarely rusts... but it does stain, despite its name. Stains appear as an orange or brown discoloration.

Corrosion resistance of stainless steel depends on the quality and thickness of the passive layer, which is a protective layer of iron/chromium oxide.

Passive layers are extremely resistant to many chemical substances. However, passive layer of brand new instruments is necessarily still thin and so these instruments tend to be more sensitive to cortical treatment conditions than are older instruments. Among few substances that can attack and destroy this layer are the halogen salt, chloride is the most powerful of them. It tends to react with the passive layer leading to "pitting corrosion" and also "stress corrosion". So, for that reason never immerse stainless steel instruments in salt (Na Cl) solution.

Surgical Residues Blood, pus, and other secretions contain chloride ions that 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.

Even tap water: can stain an instrument. Tap water contains a high concentration of minerals that 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 – 8pH) for optimal results. Anything higher may damage the instrument and is not necessary.

Do not use Alkaline Solution, dish soap, laundry soap, or surgeons hand scrub. These products will cause spotting and corrosion.



Akhyar Surgical Professionals

Care of Surgical Instruments

Using an instrument cleaning brush is a good idea, especially for jaw serrations, teeth, and hinged areas.

Cleaning After Surgery: The washing process should begin **within 60 minutes** after surgery, even if sterilization will take place much later. Washing instruments within a few minutes of surgery is your best defense against corrosion, pitting, and staining. However, it should not exceed 4 hours. Use only approved solutions. Non-approved solutions are any that do not specifically state on the label that uses include surgical instruments, stainless steel, and sterilization. Approved solutions are specially designed for surgical instruments and the sterilization cycle.

Instruments incorporating cavities such as cannulas or tube shafts are always difficult to process; so special care and attention should be directed to its cleaning steps. Also they should be checked for obstructions. Obstructed instruments should be processed and in case it does not help, such instruments should be discarded.

Dental materials adhering to dental instruments (such as filling materials or cement remover) must be cleaned a way immediately after each use, otherwise the material will be harden on the instrument and cause corrosion. It is highly recommended to inspect different instruments after cleaning and before further processing. Instruments with hairline cracks in the joint area as well as those are damaged must be replaced, as there functionality can no longer be fully guaranteed.

Moreover instruments function test is essential as those do not perform their function must be discarded as well. Generally, if the instrument has oxide layer, spots, cracks, scratches, pit, hole worn out blades, inefficient cutting, dull surface and rust then do not put the instrument into services.

Instruments with coagulation residue that cannot be removed even by intensive cleaning (with brushes or ultrasonic) must be discarded, as their function and required hygienic condition cannot be guaranteed.

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.

Before placing into the ultrasonic unit, clean instruments of all visible debris by washing them in an approved instrument cleaning solution.

Don't mix dissimilar metals (such as aluminum and stainless) in the same cycle. Because it can result in electrolysis process and can cause corrosion of the instrument. Make sure instruments have plenty of room. Don't overload your ultrasonic cleaner. As with all types of



Akhyar Surgical Professionals

Care of Surgical Instruments

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. 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 solution, when properly mixed, effectively reduces the surface tension of the solution and increases the ultrasonic cavitations process. The solution should be changed at least daily, or sooner if the solution appears dirty or murky.

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, screw joints and friction surfaces, should be lubricated regularly. Before auto calving, lubricate all instruments that have moving parts. Only use surgical lubricants because they are steam-penetrable. Surgical instruments care agents is mainly Paraffin/white oil based, bio compatible in accordance with international pharmacopoeia.

Wrapping Materials, Surgical Towels, and Drapes: Wrapping of surgical instruments is essential in the sterilization process. If your practice uses reusable towels and drapes, please be certain to use as little laundry detergent as possible.

Towels and drapes can retain soap particles. During the autoclave cycle, steam passes through the fabric, picking up these soap particles and depositing them on 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

Difference Between Rust and Stain on Surgical instruments

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**.



Akhyar Surgical Professionals

Care of Surgical Instruments

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.

Sharpening: Instruments which may require more frequent sharpening and adjusting include; Scissor, Needle holders, Bone Cutters, Hemostats, Osteotomes, Rongeurs, Chisels, Bone curettes, Knives and Punches.

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.

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