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Tech Notes contain additional information on the features and applications of our instruments.

Cleaning & Sterilizing Techniques

Summary: The following are guidelines of Cleaning, Sterilizing & Maintaining surgical instruments.

Use of distilled or deionized water and a neutral pH cleaning solution is recommended for all these procedures.

1. Rinsing-
Immediately after surgery, rinse instruments under warm (not hot) water. It may be helpful to use a nylon toothbrush to rinse the lock boxes and joints of the instrument. Be sure to remove all blood, body fluids, and tissue.

2. Cleaning-
If you do not clean your instruments immediately after rinsing, instruments should be submerged for a in a solution of water and neutral pH (7) detergent.

A. Ultrasonic Cleaning-
We recommend you manually clean micro & delicate instruments.

Instruments should be processed in a cleaner for the full recommended cycle time-usually 5-10 minutes.

Place instruments in open position into the ultrasonic cleaner. Make sure that sharp blades such as scissors, knives, osteotomes, etc. do not touch other instruments.

All instruments have to be fully submerged.

Do not place dissimilar metals (stainless, copper, chrome plated etc.) in the same cleaning cycle.

Change solution frequently, at least as often as recommended by the manufacturer.

Rinse instruments after ultrasonic cleaning with distilled or deionized water to remove ultrasonic cleaning solution.

B. Automatic Washer Sterilizers-
Follow manufacturers' recommendations. Make sure instruments are lubricated after last rinse cycle and before sterilization cycle.

C. Manual Cleaning-
Most instrument manufacturers recommend ultrasonic cleaning as the best and most effective way to clean surgical instruments, particularly those with hinges, locks, and other moving parts. If ultra sonic cleaning is not available observe the following steps.

I. Use stiff plastic cleaning brushes (nylon etc.).
Do not use steel wool or wire brushes except specially recommended stainless steel wire brushes for instruments such as bone files, or on stained areas in knurled handles.

II. Use only neutral pH (7) detergents. If not rinsed off properly after cleaning, low pH detergents will breakdown the stainless protective surface and cause black staining.

High pH detergent will cause surface deposit of brown stain (this deposit may look like rust) which will also interfere with smooth operation of the instrument.

III. Brush delicate instruments carefully and, if possible, handle them totally separate from general instruments.

IV. Make sure all instrument surfaces are visibly clean and free from stains and tissue.

This is a good time to inspect each instrument for proper function and condition.

Check the following:
Scissor blades glide smoothly from open to closed (they must not be loose when in closed position). Test scissors by cutting into thin gauze. Three quarters of the length of the blade should cut all the way to the scissor tips, and not hang up.

Forceps should have properly aligned tips.
Hemostats and needle holders should not show any light between the jaws. They should lock and unlock easily and the joints should not be too loose. Check needle holders for wear at the tips.
Suction tubes should be clean inside.
Retractors should open, close and lock properly.
Blades of all cutting edges should be sharp and undamaged.

V. After manually scrubbing instruments, rinse them thoroughly under running water (distilled water is best). While rinsing, open and close scissors, hemostats, needle holders and other hinged instruments to make sure the hinge areas are rinsed out, as well as the outside of the instruments.

3. After Cleaning-
If the instruments are to be stored, let them air dry and store them in a clean and dry environment.

4. Autoclaving-
If instruments are to be reused or autoclaved:

A. Lubricate all instruments which have any metal to metal action such as scissors, hemostats, needle holders, and retractors.
Lubricants such as instrument milk are best. **Do not use WD-40 oil or other industrial lubricants.**

B. Use disposable paper or plastic pouches to sterilize individual instruments. Make sure you use a wide enough pouch (4" or wider) for instruments with ratchet locks such as needle holders and hemostats so the instrument can be sterilized in the open and unlocked position.

If you are autoclaving instrument sets unlock all instruments and sterilize them in an open position. Place heavy instruments at the bottom of the set (when two layers are required).

Never lock an instrument during autoclaving. It will not be sterile as the steam cannot reach the metal to metal surfaces. The instrument might develop cracks in hinged areas caused by the heat expansion during the autoclave cycle.

Do not overload the autoclave chamber. Pockets may form that do not permit steam penetration. Place a towel on bottom of pan to absorb excess moisture during autoclaving. This will reduce the chance of getting "wet packs". Make sure the towels used in sterilization of the instruments have no detergent residue and are neutral pH(7) if immersed in water. The residue of the inexpensive, high-pH (9-13) detergents used by some laundries to clean the towels could cause stains on some instruments.

CAUTION: At the end of the autoclave cycle- before the drying cycle- unlock the autoclave door and open it more than a crack about ¾". Then run the dry cycle for the period recommended by the autoclave manufacturer. If the autoclave door is opened fully before the drying cycle, cold room air will rush into the chamber, causing condensation on the instruments. This will result in water stains on the instruments and cause "wet packs".

If you have unusual staining on your instruments during sterilization contact your local instrument representative or look in our web site under staining.

5. Cold Sterilization-
Most cold sterilization solutions render instruments sterile only after a 10 hour immersion. This prolonged chemical action can be more detrimental to the surgical instruments than the usual 20 minute autoclave cycle. If the instruments need to be disinfected only, cold sterilization is recommended since disinfection will take place in only 10 minutes.

Keep in mind the difference between STERILE and DISINFECTED: Sterile- an absolute term (no living organism survives); Disinfected- basically clean.

Always use the proper sterilization/cleaning technique to render the instrument in required condition for use.

Important: For instruments with tungsten carbide inserts such as needle holders, scissors, and tissue forceps we do not recommend use of solutions containing Benzyl Ammonium Chloride. This will destroy the tungsten carbide inserts.

Instrument Trays

Summary: Sterilizing trays are designed for autoclaving, organizing, and storing surgical instruments.

Sterilizing trays are used for autoclaving, organizing, and storing surgical instruments. Heavy duty stainless steel trays usually have a corrosion resistant surface. Trays have a solid bottom or perforations on the bottom. Perforations allow steam to circulate during the autoclaving process and let water drop down to the bottom of the tray to reduce spotting on instruments (for additional information please see our section on proper instrument cleaning and sterilization techniques). Lids are available for all trays.

A shallow perforated tray combined with a deep solid tray can be used for cleaning, rinsing, sterilizing, and lubricating instruments. The heavy gauge stainless steel material allow them to withstand repeated cold chemical soaks, rough handling, and the harsh environment found in autoclaves.

Instrument Storage

Summary: How to properly store surgical instruments.

When storing or handling surgical instruments it is recommended that they never be stacked or piled together. This may cause physical or other damage to instruments, including even the larger ones. Instrument edges, points and finish are best protected by individually laying them in a storage container. It is most important that this area be a dry cabinet or drawer. The use of drying agents such as silica packets or even an open box of baking powder will aid in controlling moisture.

When storing instruments re-using the tip guard included with many instruments may reduce damage to instrument tips. As a reminder, do not autoclave an instrument with the tip guard on the instrument. The tip guard might retain moisture that could cause staining, or the tip may not be sufficiently sterilized. H.WILFRED offers 3 instrument Roll-Paks for storage. The Roll-Paks should not be used in an autoclave.

The use of disposable instrument pouches is an excellent way to store and autoclave instruments. The pouches keep the instruments from touching each other and the sterilized indicator strip will insure the instruments are ready for use after autoclaving.

Make sure all instruments are properly cleaned, sterilized, and lubricated before storing. This is the best way to prevent water spotting, staining, and more serious damage to instruments.

Silicone Instrument Cup

Summary: The silicone instrument cup is specially designed to hold surgical instruments.

The Silicone Instrument Cup is unique in that it has a scalloped brim to hold instruments in the open position securely without damaging delicate tips. Large instruments will rest where placed against the soft bottom and side. The slip resistant surface makes relocating the cup safe and easy. The wide mouth design prevents instruments from touching one another.

Please do not autoclave instruments in the silicone instrument cup.

Staining of Surgical Instruments

Summary: Stains can either be plated or deposited on the surface of an instrument.

Stains are discoloration of metal by material being just added to the surface of the metal. Stains are often mistaken for rust- an actual change to the metal material. A brown/orange color stain is the most common and is often mistaken for rust. The brown/orange color stain is usually a phosphate deposit on the instrument. Phosphate can come from traces of minerals in the autoclave water source, a dirty autoclave, high alkaline or acidic detergents, surgical wrappings, and dried blood or tissue. Hot steam in the autoclave deposits the phosphate and produces the stain on the instrument’s surface. Remove this type of stain from the instrument by rubbing with a pencil eraser (rust cannot be removed by an eraser).

A brown/orange stain or a blue-black stain can occur from plating during the cleaning or autoclaving process. Through electrolysis when dissimilar metals touch while being autoclaved, ultrasonically cleaned, or sometimes even stored together, plated stains actually bond the stain material to the instrument metal. They do not often change the

metal material except for the discoloration. These stains are very difficult to remove and should be sent to a surgical instrument service facility for refinishing.

Black stains are usually due to an acid reaction. An acidic detergent deposit left on the instrument during autoclaving might cause a black stain. Always use neutral pH detergents and distilled deinonized water in your autoclave process, and be sure to completely rinse instruments before autoclaving.

Multi-colored stains or chromium oxide stains result from excessive heat. These rainbow colored stains indicate the instrument may have lost some of its original hardness after being heated. Cutting edges loose their sharpness quickly when hardness is reduced. Flash flame decontamination (an instrument is decontaminated by inserting it into a flame for a few seconds) changes the molecular structure of most material adversely, shortening the useful life of instruments. Consider another method of decontamination where lower heat levels can be applied to keep your instruments useful for many more years

Pitting of Surgical Instruments

Summary: Pitting can occur on a surgical instrument when it is improperly autoclaved or cleaned.

Pitting can occur when an instrument is autoclaved using a solution containing chloride or an acid based detergent. Hydrochloric acid forms in the solution removing the protective chromium oxide layer of the stainless steel. The acid can then attack the unprotected steel and cause pitting.

Avoid the problem of pitting by using only pH neutral (7.0) detergents and making sure all instruments placed in the autoclave are thoroughly rinsed before being put in the autoclave.

Pitting can also occur if dissimilar metals come in contact with each other in an ultrasonic cleaner or autoclave. Electrolysis from dissimilar metals touching in a solution (the steam in the autoclave acts as a conductive solution that allows electrolysis) transfers metal molecules from one instrument to the other, leaving pits in one instrument.

Avoid having any instruments touching during autoclaving, cleaning or storage to eliminate pitting.

Rusting of Surgical Instruments

Summary: True rust on a surgical instrument is very rare.

True rust on a quality surgical instrument is very rare. Rusting can be caused by the chromium oxide layer on the instrument coming in contact with very caustic chemicals

over a long period of time. Stainless steel may rust if the surface has not been passivated (processed to create a thin oxidation layer) or finished properly. Old instruments with carbon, chrome, and nickel plating can rust when the plating wears off exposing the steel underneath.

What is often thought to be rust is actually mineral deposits resulting from improper cleaning or autoclaving procedures. Rubbing the instrument with a pencil eraser will remove mineral deposits but will not remove rust. See the "Cleaning, Sterilization & Maintenance of Surgical Instruments" section of any H.WILFRED catalog for complete instructions on cleaning and autoclaving.

Cleaning the hinged area of a surgical instrument

Summary: Instructions on proper cleaning of the hinged area of a surgical instrument.

It is important to keep the hinged area of scissors and other instruments clean and clear of tissue and other matter. Over time, the small area in and around the hinge can build up a hardened layer of material resulting in corrosion. Once this build up begins the effectiveness of the instrument is quickly reduced.

It is recommended that the instrument be washed by hand using a small nylon brush to remove debris. To assist cleaning, use a pH neutral enzymatic cleaner detergent with distilled water. When used as a pre-soak it is very effective in breaking down trapped debris in and around the hinged area. Then rinse the hinged area with distilled water to wash away unwanted material and excess pre-soak solution.

Another effective way to clean your instruments is to use an ultrasonic cleaner. Both are safe to use during ultrasonic cleaning sessions. It is critical to the operation and long life of a surgical instrument to finish the cleaning by applying Lubricant. A light application to the hinge area after cleaning will help prevent corrosion and staining.

Enzymatic Instrument Cleaner

Summary: Enzymatic cleaners are useful on surgical instruments because the enzymes break down organic materials quickly and easily.

Enzymatic Instrument Cleaner breaks down organic materials such as blood, mucous, and sputum faster and more effectively than ordinary instrument cleaners, especially if this material has dried and hardened. Enzymatic cleaners do not contain scale forming phosphates, chlorides, or hydroxides.

It contains no animal enzymes. Enzymatic instrument cleaner can be used for manual, automatic, and ultrasonic cleaning. This type of cleaner is effective for stainless steel, aluminum, tungsten carbide, copper and brass instruments.

Stainless Steel, Passivation, and Polishing of Surgical Instruments

Summary: An explanation of how a stainless steel instrument is processed and finished.

Stainless steel is a metal which resists rust, can be ground to a fine point, and retains a sharp edge. Its composition can be altered to enhance certain qualities. For example, a manufacturer can make a scissor of stainless steel with carbon to create a harder cutting edge on a scissor. It is the Carbon in the stainless steel that makes the scissor stronger but the Carbon can cause the instrument to rust and corrode. All stainless steel can stain, pit, and rust if not cared for properly. Please consult our web page for care and handling instructions. When manufacturing a stainless steel instrument it is subject to a passivation and polishing process in order to make the steel as stainless as possible. Passivation and Polishing eliminates the carbon molecules form the instrument surface. This forms a layer which acts as a corrosive resistant seal. Passivation is a chemical process that removes carbon molecules from the surface of the instrument. This chemical process can also occur through repeated exposure to oxidizing agents in chemicals, soaps, and the atmosphere Polishing is a process used to achieve a smooth surface on the instrument. It is extremely important to polish an instrument because the passivation process leaves microscopic pits where the carbon molecules were removed. Polishing also builds a layer of chromium oxide on the surface of the instrument. Through regular handling and sterilization the layer of chromium oxide will build up and protect the instrument from corrosion. In some circumstances, that is why you will notice older instruments less corrosive than new ones. The newer instruments have not had the time to build up the chromium oxide layer. However, improper cleaning and sterilization can cause the layer of chromium oxide to disappear or become damaged thus increasing the possibility of corrosion. That is why it is so important to properly clean, sterilize, and store your instruments. For proper cleaning, sterilizing, and storage of surgical instruments please consult our web site under cleaning and sterilization techniques.

Lubricating your surgical instruments

Summary: Explanation of why you should lubricate surgical instruments.

Lubrication is the most important action you can take to extend the life of your instruments. The use of a surgical instrument lubricant, known as "milk" because of the white coloring caused by the emulsion in water, will prevent spotting from mineral deposits left behind by water after cleaning. Corrosion can also be prevented by the application of lubricant. Corrosion starts in the pores of the metal and is often related to improper cleaning.

With proper handling and lubrication the surface of your stainless steel instruments will develop a thin hard coating, similar to oxidation, which will help prevent damage from corrosion. Known as the passivation layer, it makes the instrument more resistant to staining and rusting.

In addition to stain and corrosion protection, lubrication reduces friction at the joints, keeping the action of the instrument light, delicate and smooth and extending the life of the instrument by reducing wear.