



Instrument Care And Instruction Handbook

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Introduction

There is a general misconception regarding stainless steel surgical instruments becoming stained or “rusted” after sterilizing.

The high grade steels used in the manufacturing of surgical instruments are distinguished by the specific passive layers that form a protective film. The layers are possible by the very properties of the steel alloy. Only a select number of stainless steels meet this specific requirement of surgical instrument manufacturers.

Proper material selection and rigid, good manufacturing practices prepare your instruments for a long life. Unfortunately, improper care and handling will drastically reduce the useful life of a surgical instrument. Therefore, the user must follow a consistent pattern of proper instrument cleaning and preparation. (See Easy Guide).

All too often a surgical instrument is blamed for the staining and corrosion that is caused by exposure to chloride ions and other aggressive solutions. Chloride ions are the chief cause of pitting and stress-corrosion cracking. Additionally, the use of acidic (pH 0-6) and alkaline (pH 9-14) solutions will remove chromium oxide from the stainless steel surface, causing pitting. The Steel used in surgical instruments has only limited resistance to these solutions.

This handbook will help you identify various staining problems and their root causes.

WATER

Despite its quality, ordinary drinking water is not suitable for cleaning surgical instruments. Drinking water can contain a high concentration of foreign ions which may damage instruments during cleaning. High concentrations of chlorides are particularly dangerous, as they lead to pitting and stress-related fractures.

The use of completely salt-free, demineralized water is recommended to eliminate exposure to chloride ions and the resultant pitting.

When an instrument turns various colors, i.e. brown, blue and rainbow effect, the cause can be traced back to exposure to iron, copper and manganese in water.

Since these properties cannot be excluded in ordinary drinking water it is again recommended that salt-free demineralized water be used. Fortunately, these discolorations can be easily removed by using appropriate cleaning products according to the manufacturer's instructions.

PREPARATION FOR CLEANING

It is best to clean your instruments immediately after use. This will eliminate the drying of impurities on the instruments. If it is not possible to clean immediately after use, arrange to have a basin of distilled water nearby to store the instruments until cleaning is possible. This basin should be drained and cleaned EVERYDAY. A solution of neutral pH detergent can be used instead of the distilled water, however this concentration must also be drained and the basin cleaned EVERYDAY. No instrument should be stored in an aqueous solution for prolonged periods.

MANUAL CLEANING PROCEDURE

Cleaning solutions should not be heated above room temperature. Observe the manufacturer's instructions regarding soaking times and mixture concentrations.

Fresh cleaning solutions must be used everyday. Increased levels of concentration, as a result of evaporation, increases the risk of corrosion, while increases in soil content reduce the effectiveness of the cleaning solution.

Before placing your instruments in a powdered cleaning solution, be certain that the mixture has had adequate time to dissolve.

Lint-free, soft textile cloth, paper cloth, soft plastic brushes (toothbrush) or water spray guns are recommended for manual cleaning.

After manual cleaning, thoroughly rinse the instruments. You may use ordinary drinking water for this first rinsing, however it is absolutely necessary for the SECOND rinsing to be in DISTILLED WATER! This two step rinsing will remove any remnants of surgical debris as well as remove any contaminants that may have been in the drinking water.

Adequately dry all instruments immediately after rinsing. Drying with a pneumatic gun (air) is ideal, although not always available. After gently shaking excess water from the instruments, laying them on clean, dry, lint-free towels will suffice.

ULTRASONIC CLEANERS

In our opinion, using an ultrasonic cleaner is the most effective and thorough method of cleaning your instruments. In addition to its cleaning ability, it is safer for your staff. With an ultrasonic cleaner there is less handling of your instruments, and therefore, a reduction in accidental cutting. The reduced handling also minimizes the breakage that occurs during the manual cleaning, leading to longer instrument life.

Even with the use of an ultrasonic cleaner it is absolutely vital that the concentration of the solutions be in accordance with the manufacturer's instructions. Overdoses or underdoses of the solutions will result in either acidic or alkaline pH balances, causing corrosion and result in breakage. Breaks of this type are called "stress corrosion cracking". They usually occur at the box lock joints of needle holders and hemostats, and around the screws of scissors. If you notice a build up of what appears to be rust, thoroughly clean this sediment away with a soft tooth brush. Failure to do so will result in breakage.

After ultrasonic cleaning, particular attention must be paid to thorough rinsing. All remnants of the cleaning solution must be rinsed off. Otherwise, discoloration will occur during autoclaving or heat sterilization. The use of demineralized salt-free water is recommended for the rinsing procedure after ultrasonic cleaning.

Do not allow instruments to remain in the ultrasonic cleaner after the cycle is completed.

If you soak your instruments in a disinfectant or cleaning solution PRIOR to ultrasonic cleaning, it is necessary to do a thorough rinsing BEFORE placing them into the ultrasonic cleaner.

Instruments should be ultrasonically cleaned in an open position. Do not pile instruments on top of each other, as this will inhibit cleaning and can result in instrument damage.

A dirty solution decreases the ultrasonic's performance. Renewing the bath at the manufacturer's recommended intervals will insure adequate cleaning.

STEAM STERILIZATION

When sterilizing with steam, it is important that the steam be absolutely free of foreign substances.

Damage from rusting will result unless the steam supply system is constructed of chrome nickel steel.

Complete an "empty" cycle everyday prior to sterilizing the instruments.

After sterilization, instruments must be stored dry.

Excessive condensation during sterilizations is avoided by not exceeding the maximum load of the sterilizing unit. Check the manufacturer's suggestions.

If heavy sets are unavoidable, instruments should be spread out to reduce condensation build up.

Proper dry time cycles are essential to avoid "water spotting".

LUBRICANTS AND DETERGENTS

Specific lubricants designed for surgical instruments are an excellent investment for long term protection. Besides lubricating moving parts, lubricants also inhibit rust, discoloration and corrosion. Used in a regular instrument care program the proper lubricant helps reduce instrument wear. A 30 to 60 second soaking, prior to autoclaving is adequate to insure protection.

Advantages:

Prevents frozen box locks by dissolving organic debris.

Does not interfere with steam autoclaving.

Provides a protective coating to your instruments, reducing repair costs.

Non-toxic.

Inhibits rust and discoloration.

Detergents designed for surgical instruments are specifically formulated to remove protein, organic debris and blood. The neutral pH balance will not damage stainless steel or tungsten carbide inserts. The solution is gentle enough for manual (hand) as well as ultrasonic cleaning.

INSTRUMENT CARE PROCEDURE

1. Visually inspect instruments before cleaning for cracks and chipped areas. Do not autoclave chrome plated instruments with stainless steel instruments.
2. Clean instruments thoroughly after use.
 - a. If you use a pre-soak solution; be certain that it has a neutral pH balance.
 - b. Clean instruments in an open position by either hand or ultrasonic cleaner.
 - c. Use a non-metallic brush (toothbrush) to remove stubborn debris. DO NOT use abrasive cleaning solutions or scouring pads.
 - d. DO NOT expose instruments to bleach.
 - e. ABOVE ALL, strictly follow the mixture ratios of ALL solutions with which your instruments come into contact. The failure to monitor the acidic (pH 0-6) or alkaline (pH 9-14) will lead to instrument failure.

EVEN THOUGH INSTRUMENTS ARE PASSIVATED, SERIOUS DAMAGE CAN RESULT IF THERE IS EXPOSURE TO ANY OF THE FOLLOWING:

Hydrochloric acid • Ferric chloride • Dilute sulphuric acid • Iodine • Agua regia

Whenever possible, the following substances should be kept away from instruments:

Aluminum chloride • Barium chloride • Bichloride of mercury • Calcium chloride • Carboic acid

Chlorinated lime • Dakin's solution • Ferrous chloride • Lysol • Mercury chloride • Phenol

Potassium permanganate • Potassium thioicyanate • Sodiumhypochlorite • Stannous chloride • Tartaric acid

HANDLING NEW INSTRUMENTS

New surgical instruments must be cleaned and rinsed PRIOR to the first sterilization. Cleaning and rinsing must be carried out in accordance with all previously listed instructions.

If your new instruments arrive in a plastic package that shows condensation, remove and dry them in an open position.

NO instrument should be stored in a cabinet together with any chemicals that produce a corrosive vapor. There is no procedural difference in handling instruments with a mirror (bright) or a matt (dull) finish.

EASY GUIDE

Manual Cleaning Procedure

1. Visually inspect for cracks and chipped areas.
2. Clean instruments immediately after use.
3. Use a Neutral pH balanced solution.
 - a. Follow manufacturers instructions for:
 - (a) Soaking time.
 - (b) Mixture ratios.
4. Clean all areas of the instruments with a soft brush. NEVER use a steel brush or scouring pad.
 - (a) Clean in an open position.
 - (b) Be certain ALL debris is removed from box locks.
5. After cleaning, thoroughly rinse instruments in DISTILLED water. Ordinary drinking water is not recommended unless you intend to do a second rinsing in distilled water.
6. Dry instruments with clean, dry, lint-free towels.
7. Soak in an instrument milk for 30-60 seconds just prior to sterilizing. DO NOT USE WITH DRY HEAT STERILIZERS.
8. Autoclave.

Ultrasonic Cleaning Procedure

1. Visually inspect for cracks and chipped areas.
2. Rinse off large debris in ordinary drinking water.
3. Use a Neutral pH cleaning solution.
 - (a) Follow manufacturers instructions for Mixture ratio.
4. Place instruments in ultrasonic cleaner in an open positions. DO NOT stack on top of each other.
5. Follow manufacturers instructions for cleaning cycle time. DO NOT ALLOW instruments to soak after cycle time.
6. Rinse thoroughly in DISTILLED water.
7. Dry instruments with clean, dry, lint-free towels.
8. Soak in instrument milk 30-60 seconds just prior to sterilizing. DO NOT USE WITH DRY HEAT STERILIZER.
9. Autoclave.

Cleaning And Sterilization Trouble-Shooting Guide

PROBLEM	CAUSE	PREVENTION
Spotting	Mineral deposits left by slow or improper drying	<ol style="list-style-type: none"> 1. Check operating instruments and operation of autoclave. 2. Use chloride-free solutions for sterilizing, disinfecting, rinsing and cleaning. Distilled or mineral free water preferred. (pH approx. 7.0)
Rust (corrosion)	Film left by steam	<ol style="list-style-type: none"> 1. Check purity of water supply. 2. If water softeners are used, check for composition. 3. Purge steam pipes, especially new installations.
Rust (corrosion)	Deposit	<ol style="list-style-type: none"> 1. Do not mix stainless steel with other metals especially where there is evidence of defective plating. 2. Rinse with distilled water (particularly important where tap water may have high metallic content). 3. Remove all debris from lock areas, teeth, etc. 4. Dry all instruments thoroughly. Use full time cycle. This is the most important when instruments are wrapped. 5. Thoroughly clean all interior surfaces of sterilizer.
Pitting	Chemical and electronic attack of surfaces	<ol style="list-style-type: none"> 1. Rinse instruments thoroughly immediately after use. 2. Avoid long exposure to chlorides and acids. 3. Do not use detergents having high pH levels. 4. Do not mix metals in ultrasonic cleaners.
Black to purple stains	Ammonia	<ol style="list-style-type: none"> 1. Avoid exposure to ammonia in solutions and cleaning compounds. 2. Rinse instruments thoroughly (distilled water preferred).
Brown stains	Minerals	<ol style="list-style-type: none"> 1. Check water supply in sterilizer. 2. Check cleaning compounds and detergents. Avoid excessive use.
Gray-Blue stains	Improper temperature	<ol style="list-style-type: none"> 1. Use fresh, cold sterilizing solutions and follow manufacturer's suggestions for use.

For additional copies of the instrument care manual, write to:

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