

# VETERINARY INSTRUMENTATION

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## INSTRUMENT CARE

The majority of surgical instruments are made of stainless steel. There are many different types of stainless steel alloys (60+), with varying amounts of nickel & chromium to increase resistance to corrosion. All types of stainless steel will corrode under certain conditions – ‘stainless’ is a little misleading. The proportions of the various constituents affect the characteristics of the final steel, along with the degree of hardening applied.

Surgical instruments must be hard enough to take and keep a cutting edge (eg scissors) or have a certain spring (e.g. artery forceps). The steel possessing these qualities contains less chromium and more carbon than orthopaedic implants, which are made of steel with the primary characteristic of resistance to corrosion, making it too soft for instruments. The penalty is that this type of higher carbon stainless steel (called Martensitic) is much more likely to corrode and stain.

The parts of the steel likely to rust are protected by a thin layer of chromium oxide which is produced by the chromium part of the steel. Actions which encourage the production of chromium oxide minimise corrosion. Actions which either physically or chemically destroy this layer of chromium oxide encourage rusting or staining. Maximising the chromium oxide layer is the basis of sound instrument care. This layer thickens with age and increases the resistance of your instruments to corrosion – in new instruments it is relatively thin. This is why you may have marking problems with new instruments but your old ones are fine – new instruments will be more intolerant of inappropriate detergents, inadequate lubrication and the corrosive environment of the autoclave etc.

### Manual cleaning protocol – stainless instruments

1. Open all joints and rinse gross loose debris from instruments in warm water (NOT hot – this will coagulate proteins & make the instruments much harder to clean) immediately after use. They will be much harder to clean if left to dry!
2. Completely submerge instruments in an enzyme based neutral pH detergent – soak for time specified in detergent instruction
3. Gently scrub instruments with a soft bristled brush to remove all remaining visible soil, keeping the instrument under the surface of the detergent to reduce spray. Use a pipe-cleaner brush on instruments with a lumen. Pay special attention to joints & ratchets.
4. Remove from the enzyme solution and rinse thoroughly in tap water for at least 3 minutes
5. Ideally place the instruments in an ultrasonic cleaning bath for 10-15 minutes or as per cleaner instruction manual.
6. Remove from bath at completion of cycle, (or after step 4 if no ultrasonic available) then rinse instruments thoroughly with purified (distilled) water.
7. Dry with a clean non-shedding wipe – leaving them to air-dry will result in water spotting.
8. Lubricate with either spray surgical instrument oil or place in instrument milk bath – follow directions for product used.

### Basic Rules

To keep your instruments in peak condition, there are some basic rules which should be followed.

1. Handle your instruments with care – dropping, scratching etc. will all damage the surface of instruments and reduce their resistance to corrosion.
2. Store with care. If instruments are stored damp they will corrode. Delicate instruments should be packed with protective tips & silicone storage box inserts to stop them rattling around. Always make sure heavy instruments are not stored on top of lighter equipment.
3. Use them to do what they were designed for! Artery forceps are not needle-holders or wire twisters, bone cutters are not designed to cut wire, and implant cutters have a size rating for a reason! Inappropriate use will damage instruments and invalidate warranties.
4. Avoid mixing different metals when processing instruments – keep chrome plated, industrial finish & aluminium items separate from stainless, particularly in ultrasonic cleaners.

Cleaned lubricated instruments are ready for packaging. Always carry out a visual check at this stage – are the cutting edges of scissors free of damage, do the jaws of artery forceps & needle-holders meet correctly with no signs of twisting for example. Check that all thumbscrews are tight, as in Gelpi & stifle distractor joints.

Also look for fine cracks in instruments, for example across the box joints in artery forceps.



*Joint showing wear due to inadequate lubrication*



*Box joint showing crack & biological debris*



*Needle-holder with damaged jaw*

Damaged items should be sent for repair or disposed of. It is good practice to sterilize items being sent for repair. Many repairers require a certificate of decontamination to be sent with instruments, and instruments should never be sent out in a soiled condition.

There are many materials for packing instruments for autoclaving. Paper peel-packs are commonly used, along with nylon autoclave film. We do not recommend the use of laundered fabrics as instrument wraps, as residual detergents and bleaches can cause pH & chlorine related damage to your instruments. Disposable autoclavable instrument wrapping fabrics similar to disposable drapes are available.

## **Sterilisation**

The autoclave is a very hostile environment for your instruments. The combination of heat & moisture promotes corrosion and staining, particularly if there are residual detergents etc. in wrapping materials. This is also true where tap water instead of distilled or demineralised water is used in the autoclave.

Mineral deposits on instruments are unsightly as well as interfering with normal joint function etc. They are difficult to remove, so prevention is better than cure.

Rust in the steam pipes of your autoclave will transfer to your instruments, so autoclave maintenance is important. Regular servicing ensures the autoclave is working correctly. Vacuum autoclaves help remove residual steam from packs, and it is important that directions are followed and cycles are completed.

Regularly check the door seal is undamaged, and replace if necessary. If applicable to your machine, drain & refill the water tank regularly with distilled water. You may well be surprised what comes out! If your packs are coming out of the autoclave wet through then there is a cycle problem & you need to speak to your autoclave engineer for advice. Wet storage will result in corrosion and damage to your instruments.

So – store your instruments clean, dry, lubricated & protected and they will give you many years of service. A good, easy to follow instrument care protocol will extend instrument life, save money and result in happy surgeons!