

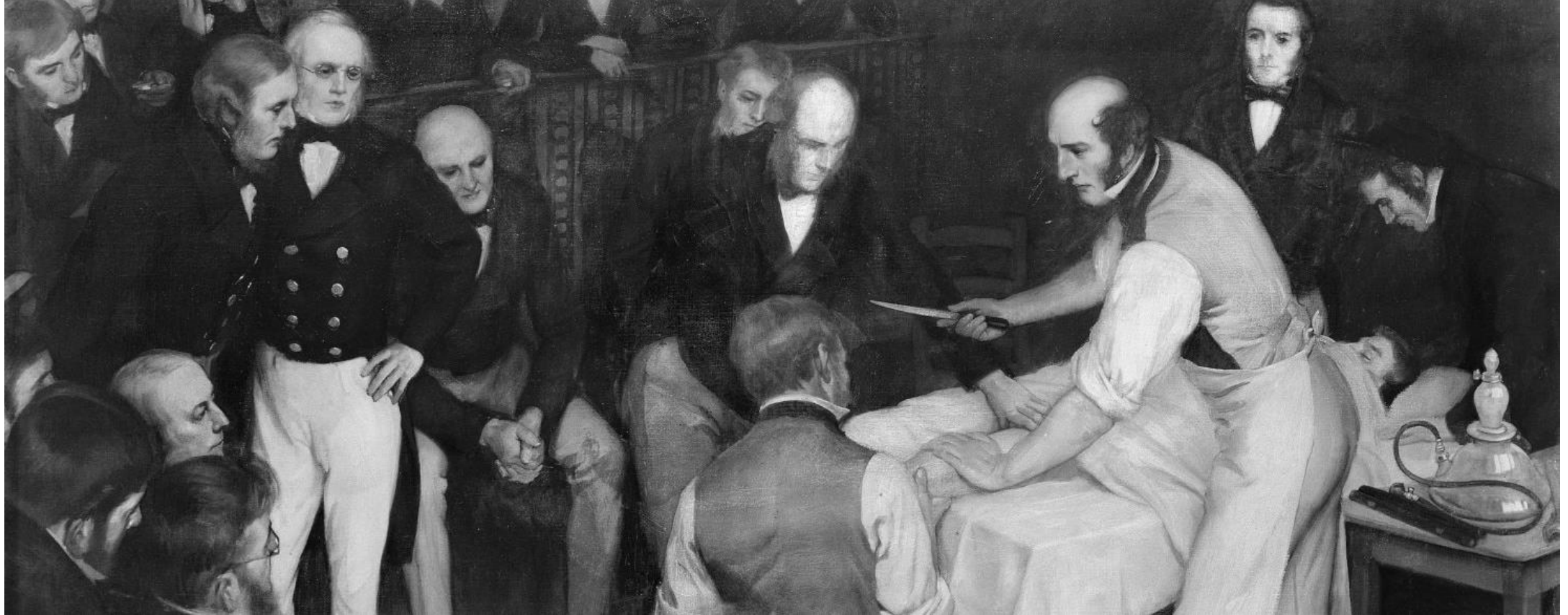


Surgical Instrument Inspection & Testing

Objectives

- Proper inspection of instruments and how to identify instruments in need of repair
- Importance of patient safety, surgeon satisfaction and cost controls
- Instrument Testing
- Instrument Maintenance

Surgical Instrument Inspection & Testing



Stainless Intro



Approximately 75% of all surgical instruments used in a healthcare organization are stainless steel.

Cost of Instrument Replacement

Description	Price List
Biopsy Punches	\$98.34
Bone Holding Clamps & Forceps	\$71.87
Cast Spreader	\$51.68
Chisels, Osteotomes	\$17.95
Tungsten Carbide Mayo 8" Needle Holders	\$70.95
Curettes	\$17.95
Crile Hemostat	\$12.95
Castroveijo Needle Holder	\$250+

400 Series Stainless Surgical Steel:

The 400-series alloy stainless steel is used when sharp cutting edges are required and is the most commonly used.

- Instruments such as scissors, osteotomes, chisels, rongeurs, forceps, hemostatic forceps, and needle holders are manufactured with the 400-series stainless steel.
- is known as *martensitic* and possesses magnetic properties.
- Most susceptible to corrosion and staining due to the high carbon content.



300 Series Stainless Surgical Steel:

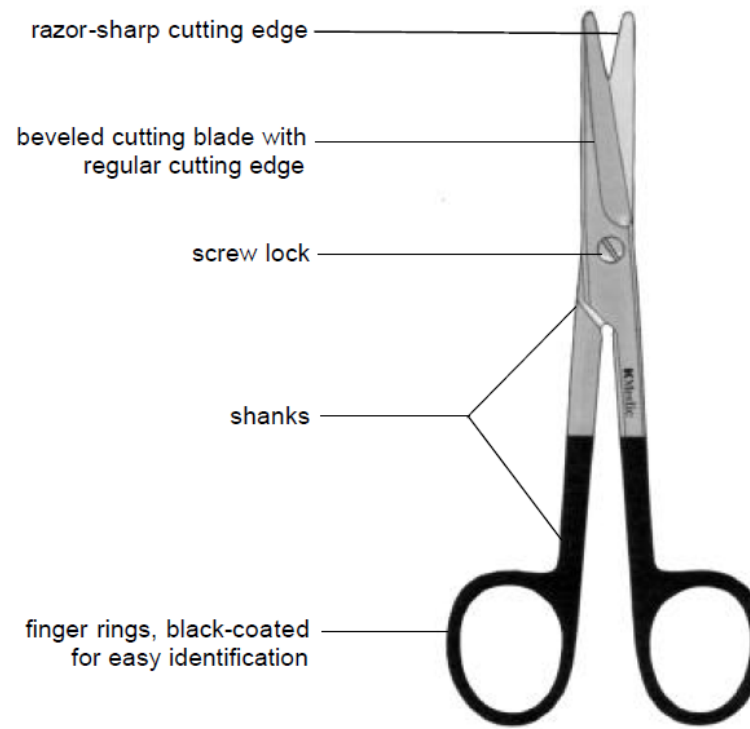
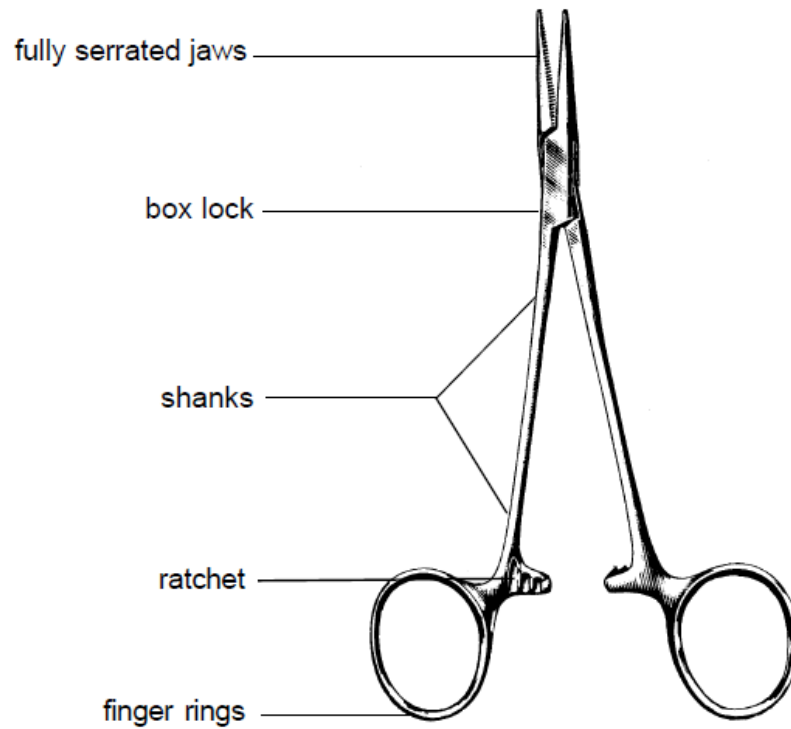
300-series stainless steel is malleable and is used when hardness is less important.

- Used in the manufacture of instrumentation such as tongue depressors, retractors, Sims speculums, cannulas, rib spreaders, and suction devices.
- known as *austenitic* (Non-magnetic) stainless steel.
- Less susceptible to corrosion as it contains a lower carbon content.



Anatomy of an Instrument

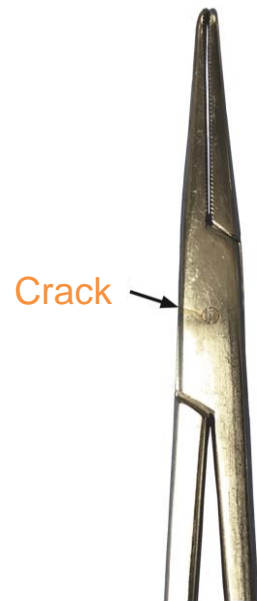
Clamp/Scissor Anatomy



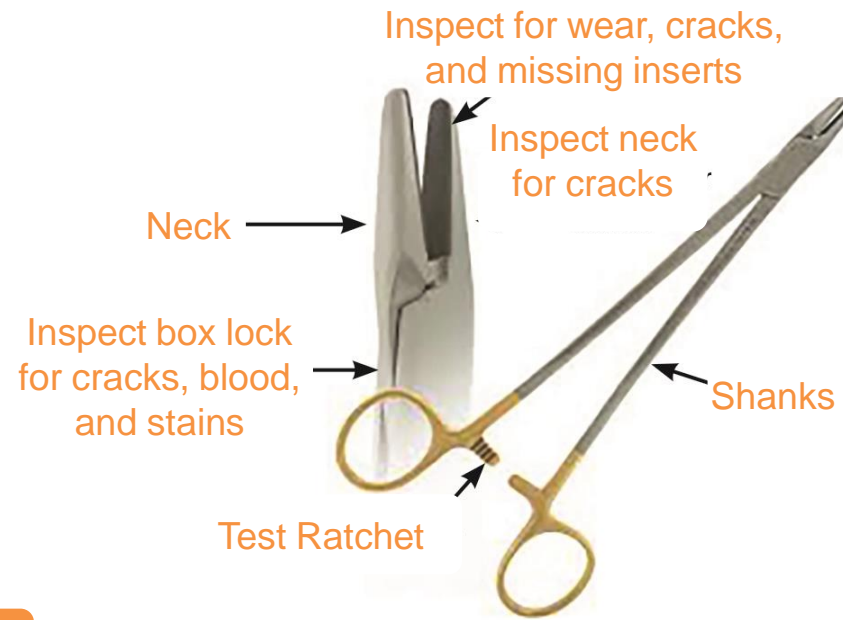
Proper care and handling along with a well-rounded instrument preventive maintenance program will help prevent more costly repairs, prolong the life of your instrumentation, and keep them in good working order.

Testing of your instruments is crucial to ensure they remain in good working order for the surgical team and more importantly, the patient.

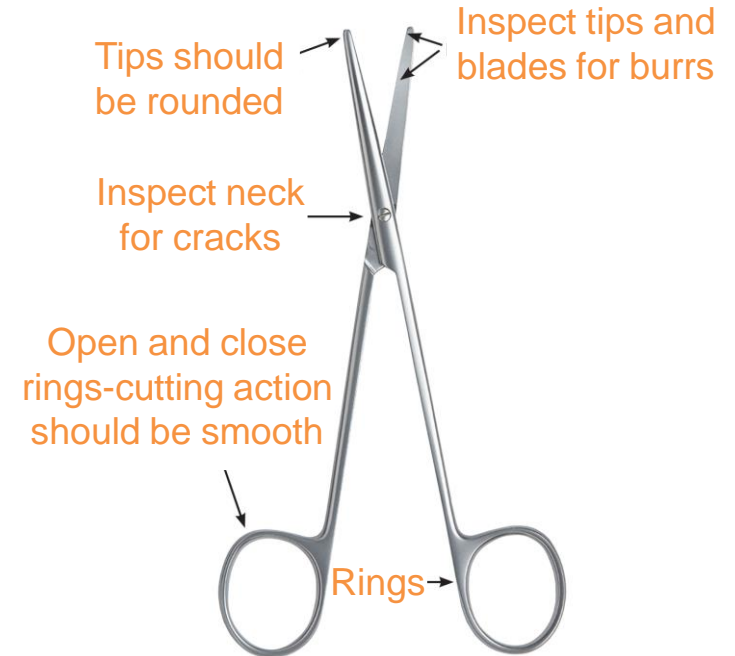
Broken instrumentation is unsafe for the patient in many ways. It may cause procedural delays which may extend the time the patient is under anesthesia unnecessarily, foreign objects can break off into the surgical site, and cracks in instrumentation can harbor bioburden causing infection or worse, death.



CRACKED BOX LOCK



MAYO-HEGAR NEEDLE HOLDER



METZENBAUM SCISSOR

Inspection Techniques



Borescope



Testing media for scissors



Gloves



Handheld lighted magnifying glass



Digital Microscope



High quality lighted magnifying lamp

Scissors

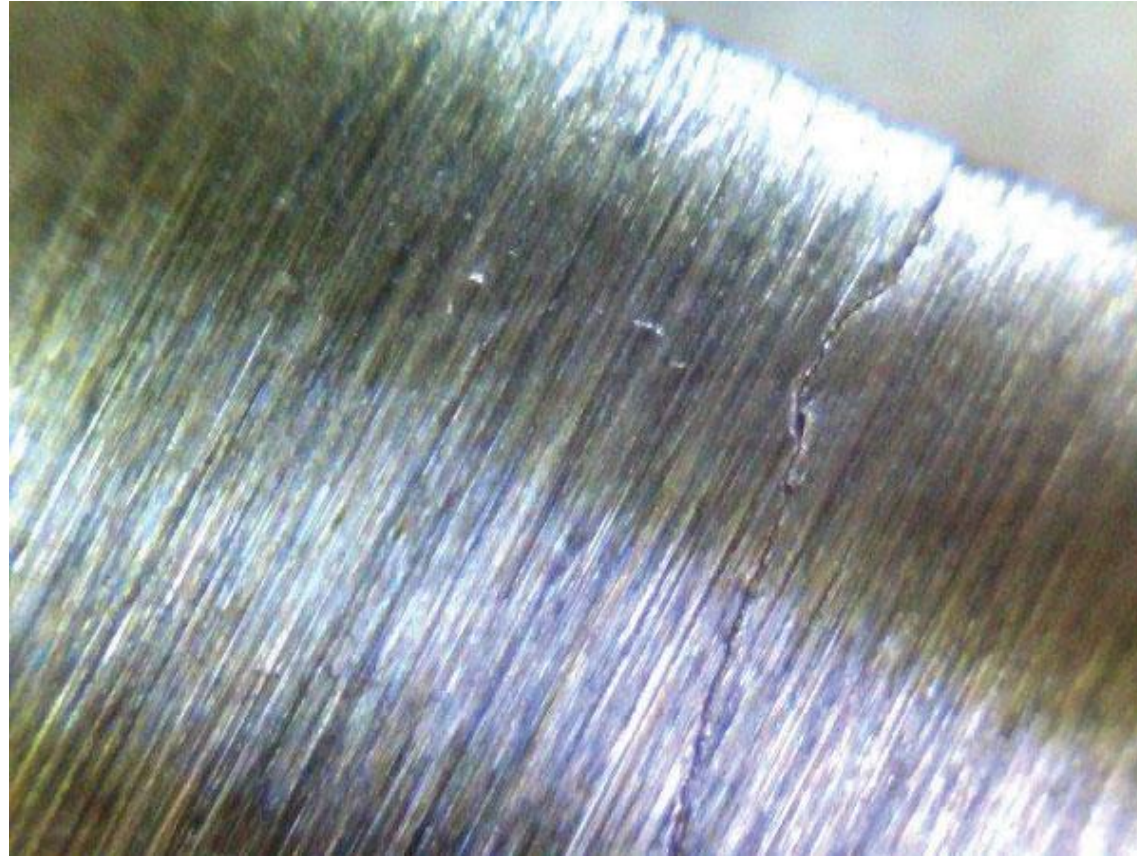
- Check for nicks, dents, dull spots
- Cutting action should be smooth
- Inspect for loose screws
- Inspect for cracks
- Inspect for burrs



Use **RED** Test Material for Scissors greater than 4.5”.

Use **Yellow** Test for Scissors smaller than 4”.

Scissors



Grasping Instrument

An instrument resembling a pair of pincers or tongs, used for grasping, manipulating, or extracting tissues during a surgical procedure

- Alignment of the jaws and tips
- Proper closure of ratchets
- Interlocking of serrated jaws
- Check for cracks
- Proper tension
- Tips should meet and closure should continue as each ratchet is engaged.
- Loose action

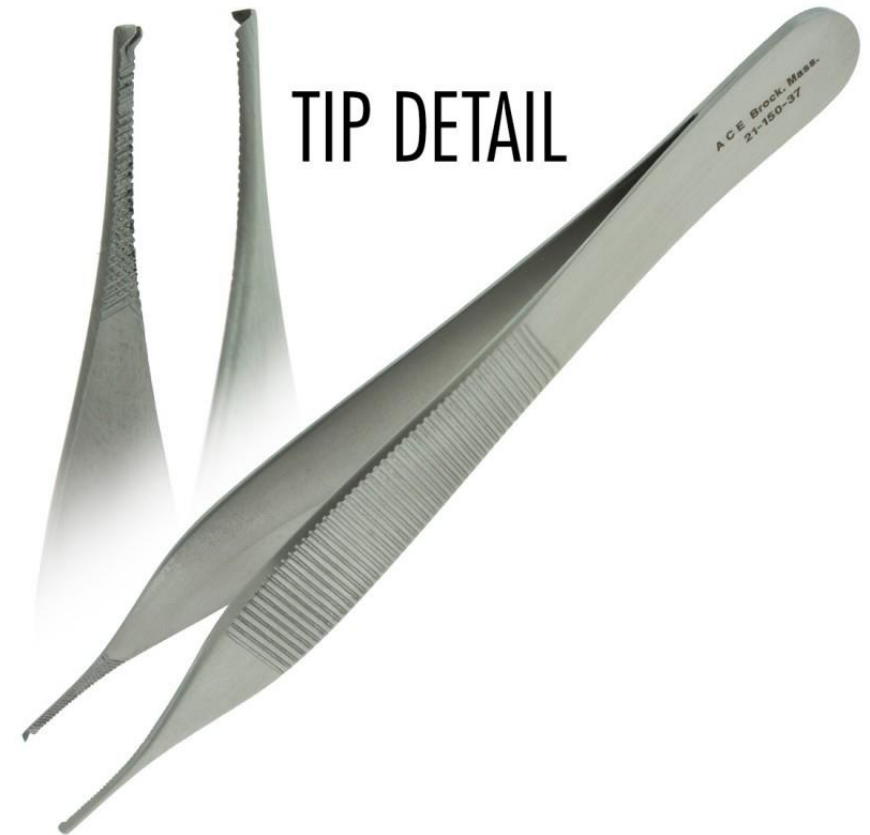


Grasping Instrument



Tissue Forceps

- Check alignment of teeth and/or tips
- Close jaws of forceps slightly, if they overlap, they are not aligned
- Teeth on tissue forceps should mesh
- Look for burrs or rough edges



Tissue Forceps



Needle Holders

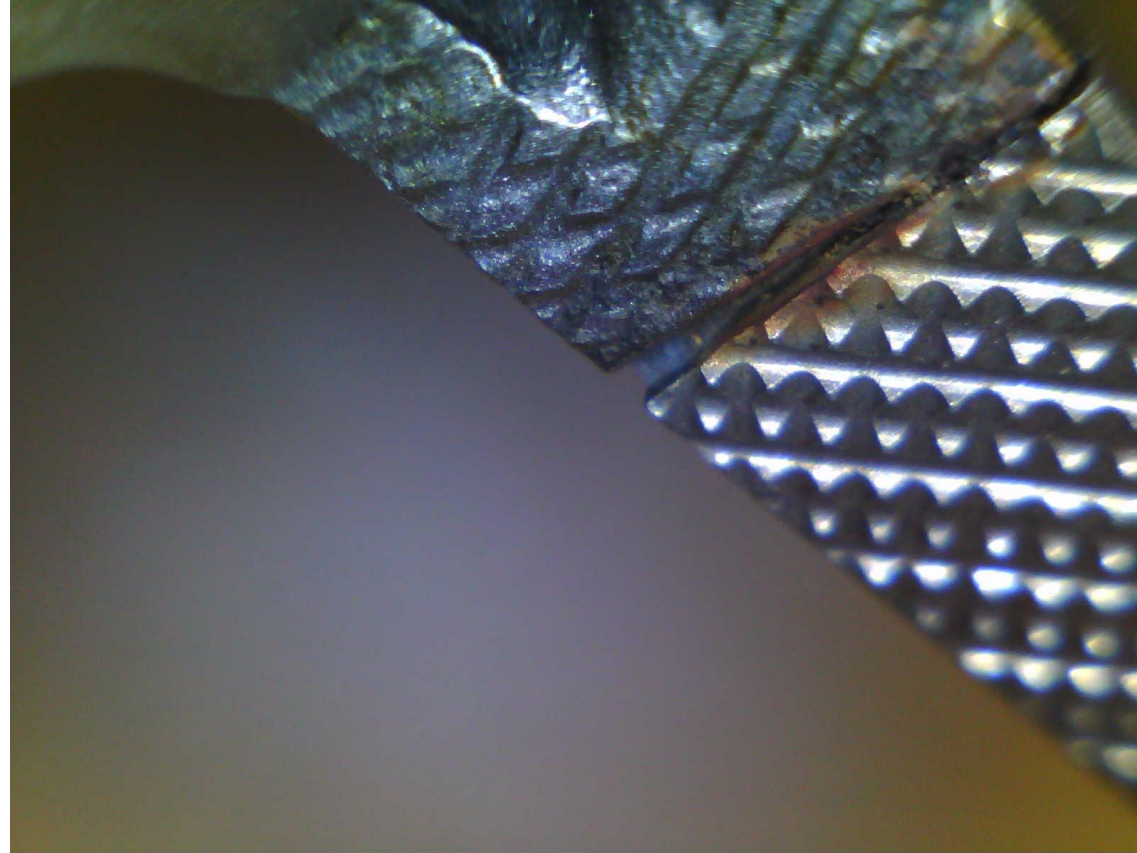
- Visually inspect insert for wear, cracks, chips in the inserts.
- Make sure light does not show through closed tips.
- Check for cracks, including at box lock



Needle Holders

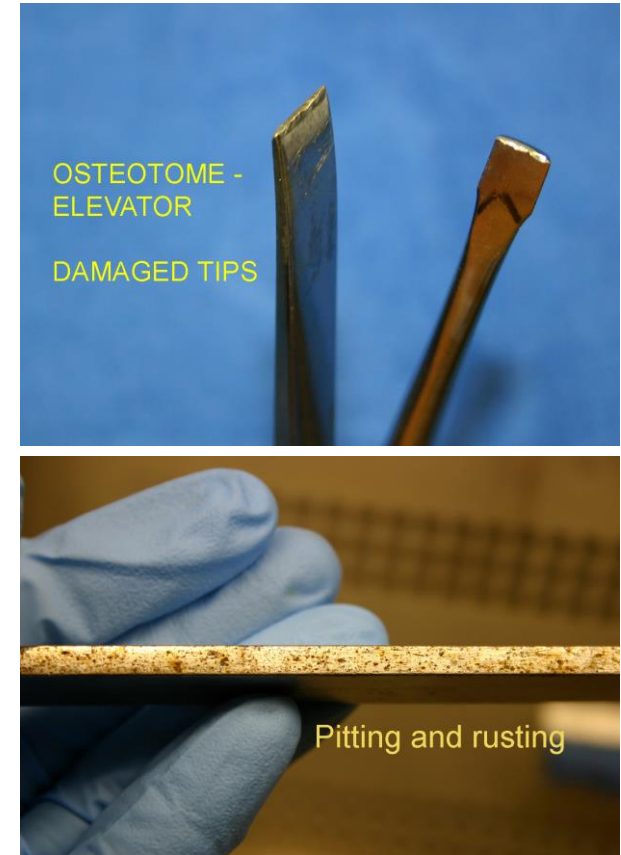


Needle Holders

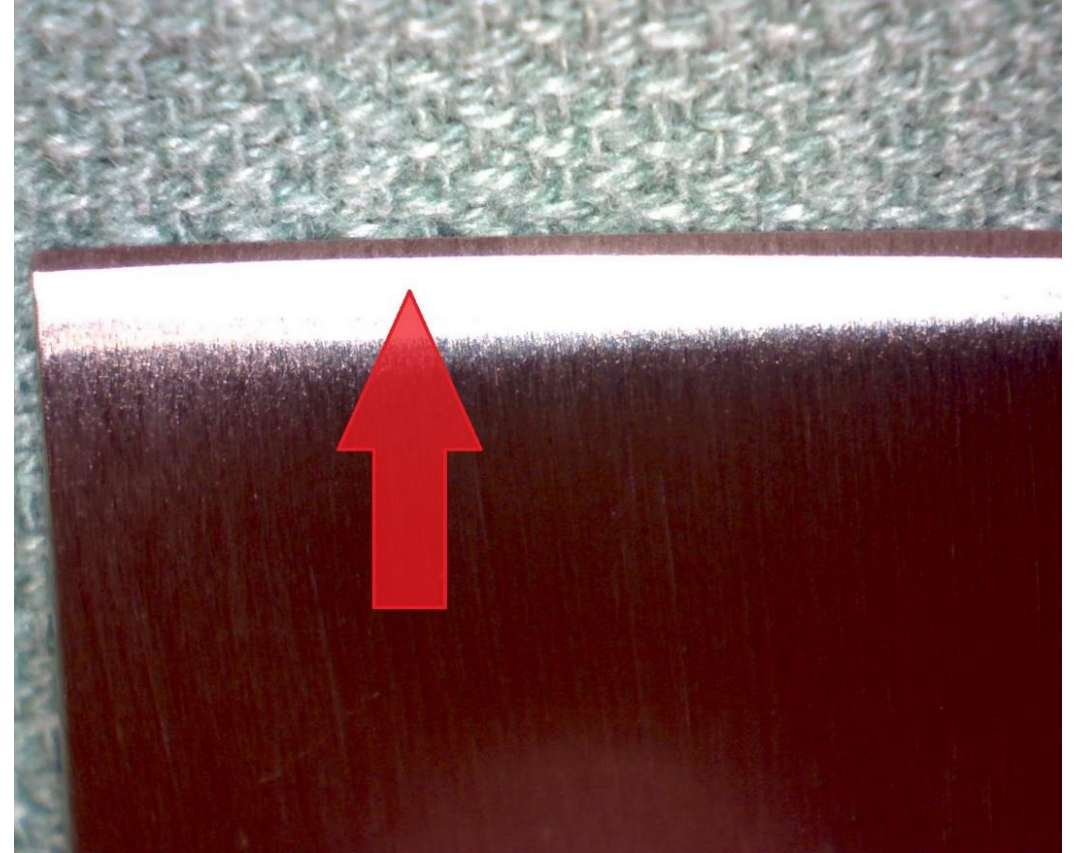
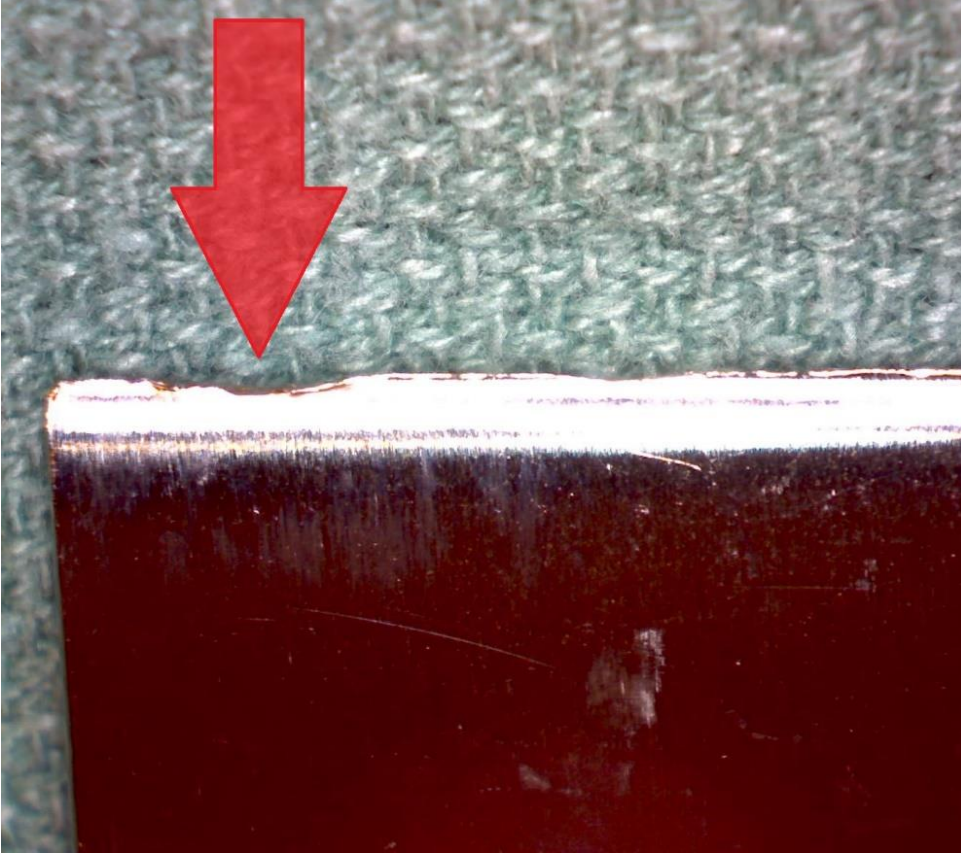


Osteotomes, Chisels and Gouges

- Inspect sharp tips for dull spots or damage
- Should be able to scrape fine shavings
- Osteotomes should have 90° corners with tapered edge
- Chisels should have angular edge with 90° corners
- Gouges need to maintain the curvature of their original state



Osteotomes, Chisels and Gouges



Curettes

- Inspect the circumference of the cutting edge for damage or dullness
- Bone curettes- check the volume of the cup
- Cutting surface needs to be flat and on the same plane

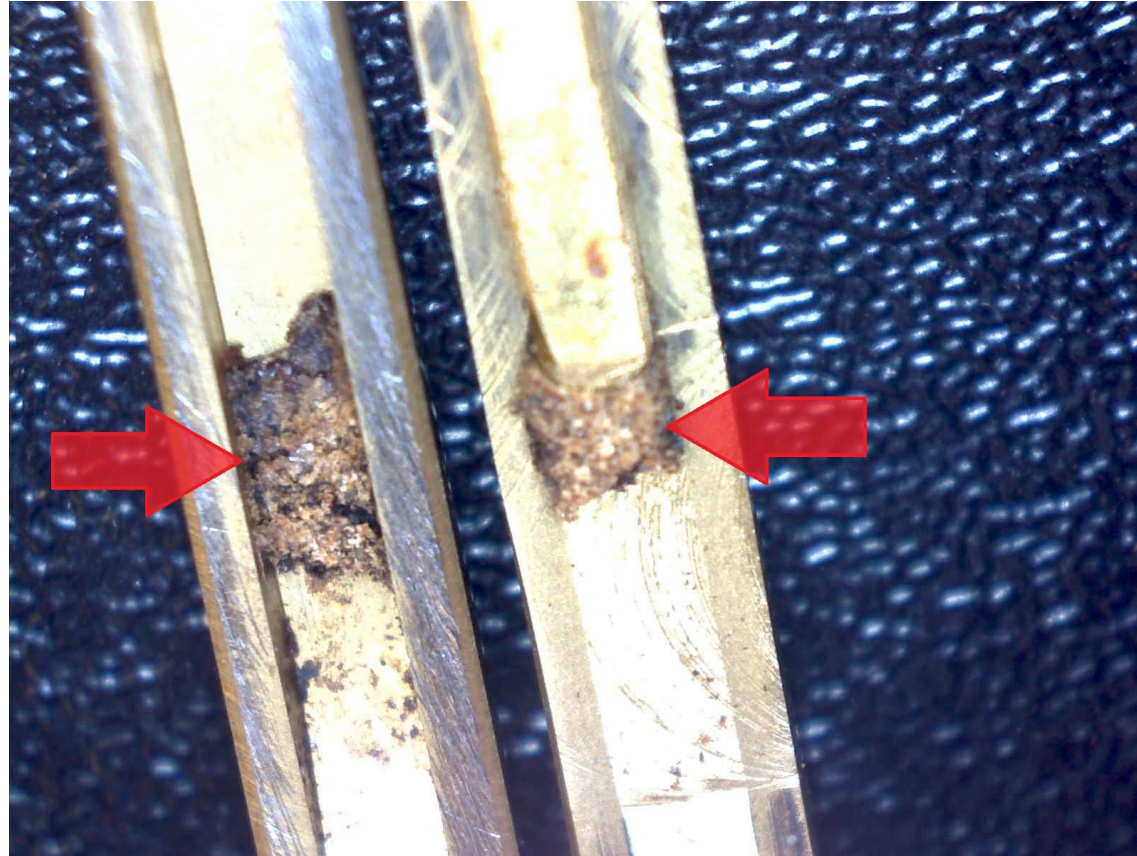


Rongeurs

- Perimeter of jaw should bite clean
- Test on card stock
- Should have clean action and smooth movement
- Jaws should align properly
- Cracked or broken springs should be replaced
- Ensure screws are snug/do not attempt to tighten in facility

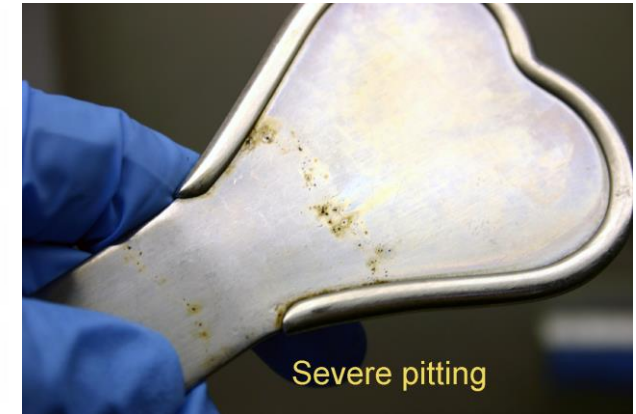
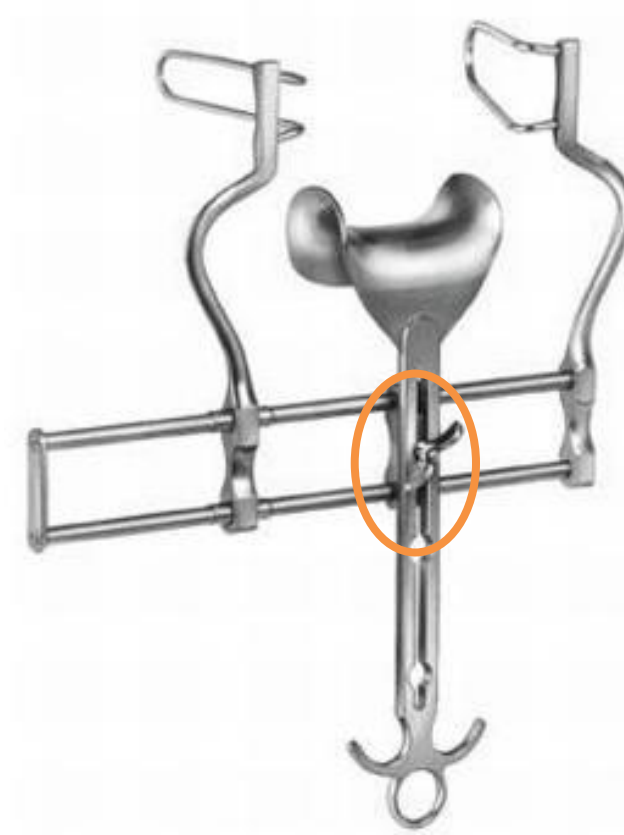


Rongeurs



Retractors

- Look for burrs on the tips of pointed retractors.
- Activate the instruments to ensure that the ratchet arm engages the ratchet bar and it holds without slipping.
- Check the ratchet spring to ensure it is strong and is putting proper force on the ratchet arm.
- Ensure that the fulcrum screw is secure.



Retractors



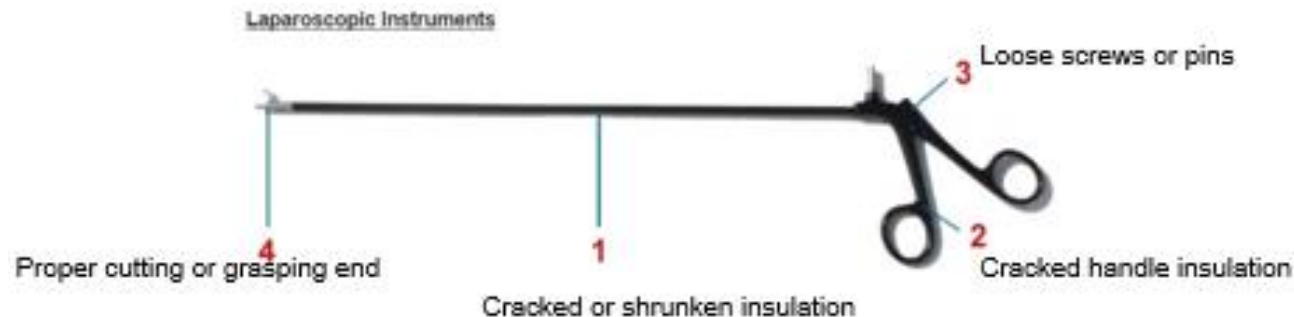
Micro Instruments

- Must use appropriate magnification (after all, this is how the surgeon sees them!)
- Test micro scissors with yellow Theraband®



Laparoscopic Instrument Inspection

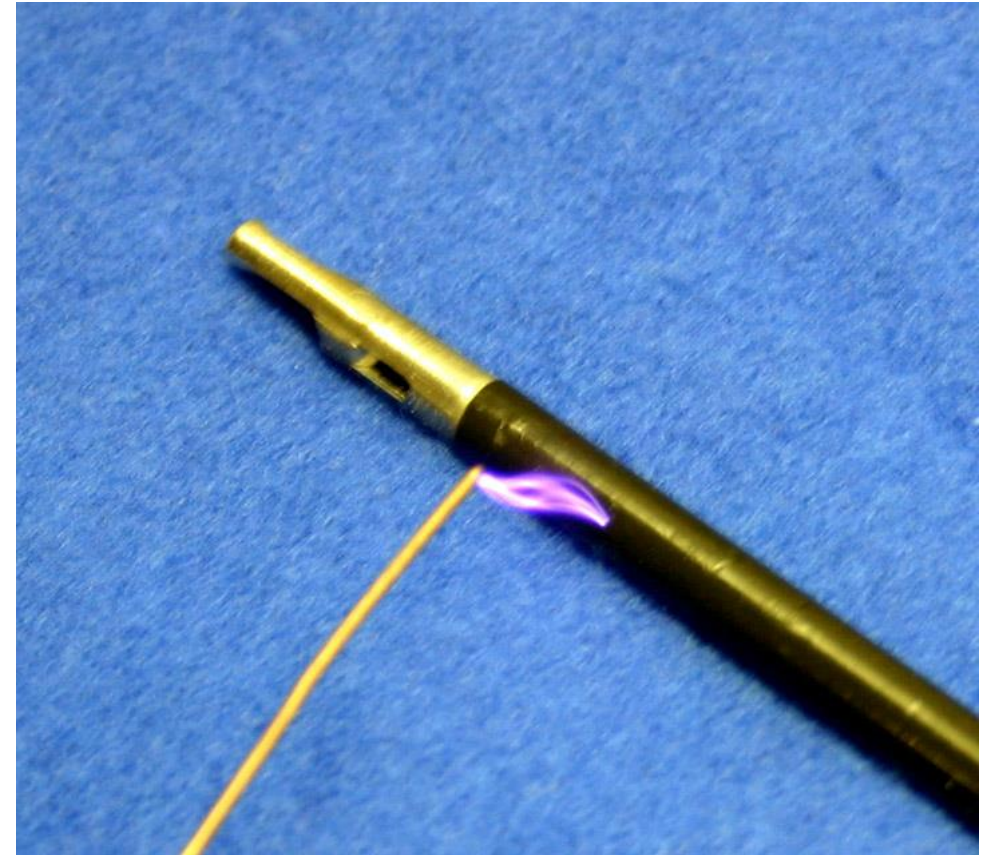
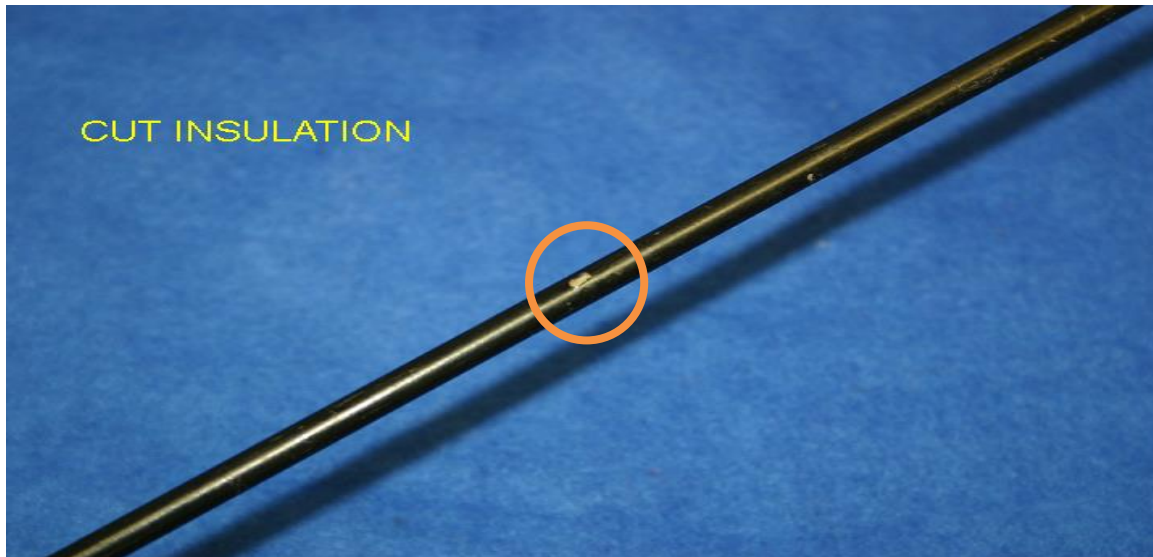
- Manipulate to test function
- Examine distal end for cracking
- Test grasping and locking action
- Visually examine / use electrical insulation testing for insulation integrity



Inspection and Testing Lap Instruments

Insulation testing

- Verify integrity of all insulation with tester
- Remember the handle!
- MUST be tested before and after each procedure



Inspection and Testing Lap Instruments



Equipment Failures



Popular Surgeries Can Carry Risk of Being Burned

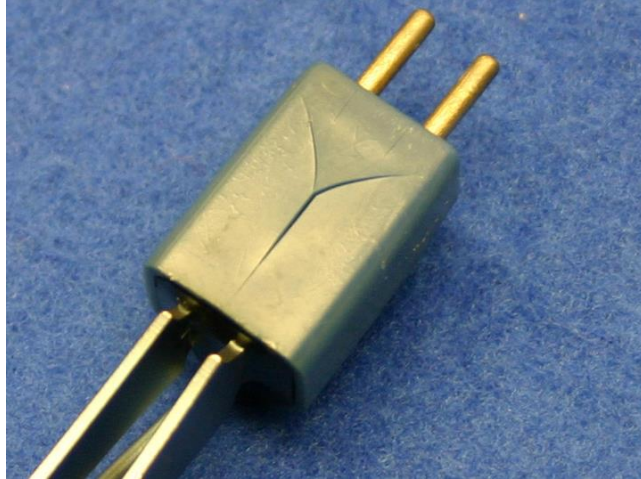
Experts say stray energy injuries more common than health professionals realize

By Joel Grover, Matthew Glasser and Cole Sullivan

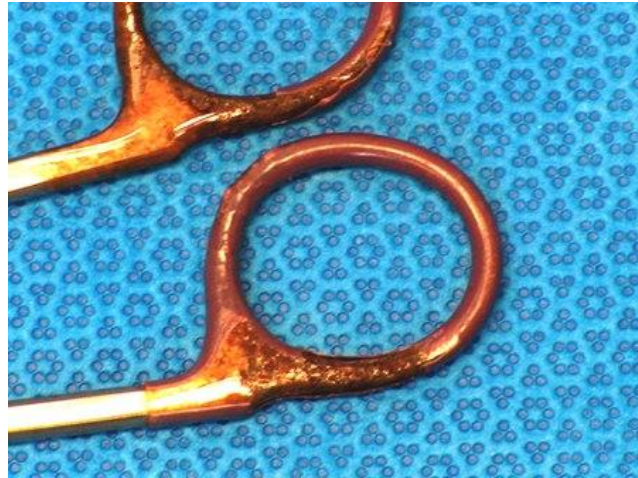


Insulated Bipolar Forceps

Remember the Bipolars!

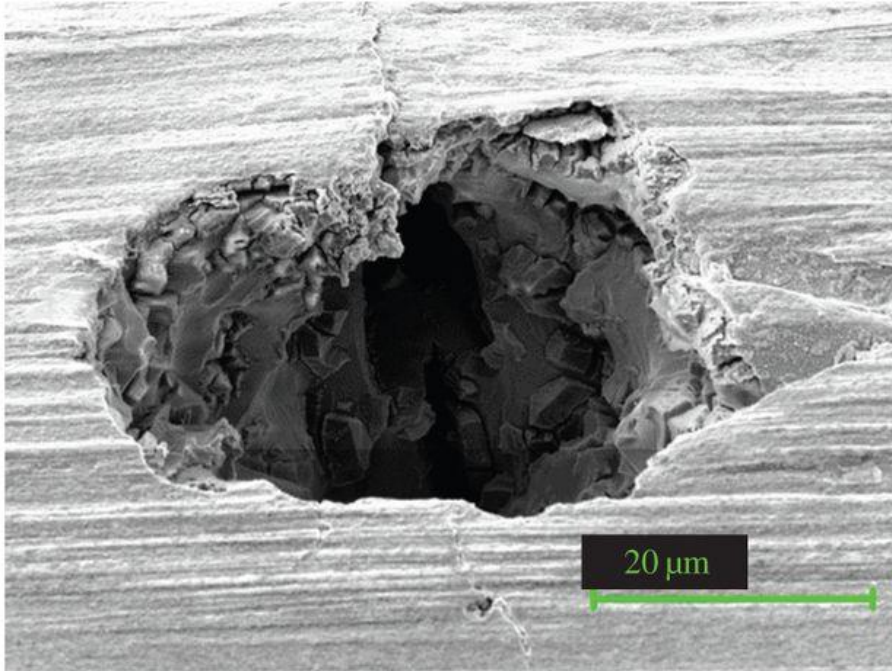


Pitting

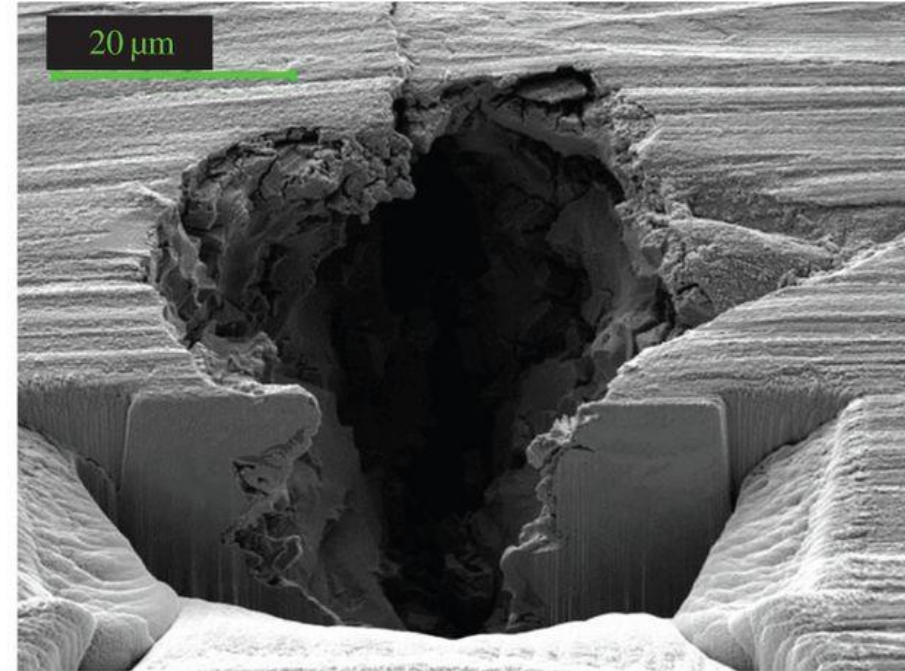


Point of Use Cleaning

(a)



(b)



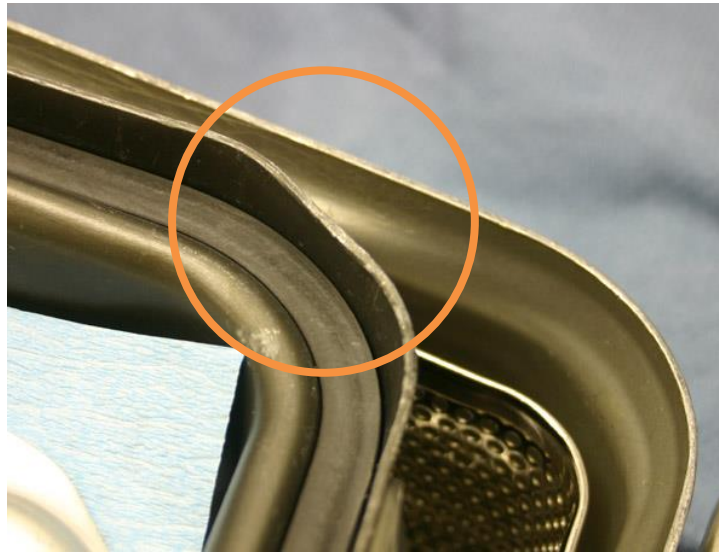
Source: Turnbull, A. "Corrosion pitting and environmentally assisted small crack growth," Proceedings of the Royal Society A Mathematical, Physical and Engineering Sciences. June 25, 2014. <http://rspa.royalsocietypublishing.org/content/470/2169/20140254>

Stains vs Rust



Sterilization Containers

- Check for dents that may affect gasket seal
- Check gasket for tears, cuts, shredding or separation of the vulcanized joint
- Inspect latch
- Check retention plate to assure lever locks tightly



Preventive Maintenance Program

Even with the best care and handling, without a good preventive maintenance program, your instrumentation will have a shorter life span. Proactive instrument maintenance program results in fewer repairs, more satisfied surgical staff and reduced instrument replacement costs. This also extends the life and quality of your equipment, improves clinical satisfaction, provides better patient outcomes, and maximizes operating room and central sterile efficiency.

A good vendor will inventory sets used, calculate frequency of the trays used, identify items that need a preventive maintenance program and set up a preventive maintenance plan that is right for your facility.

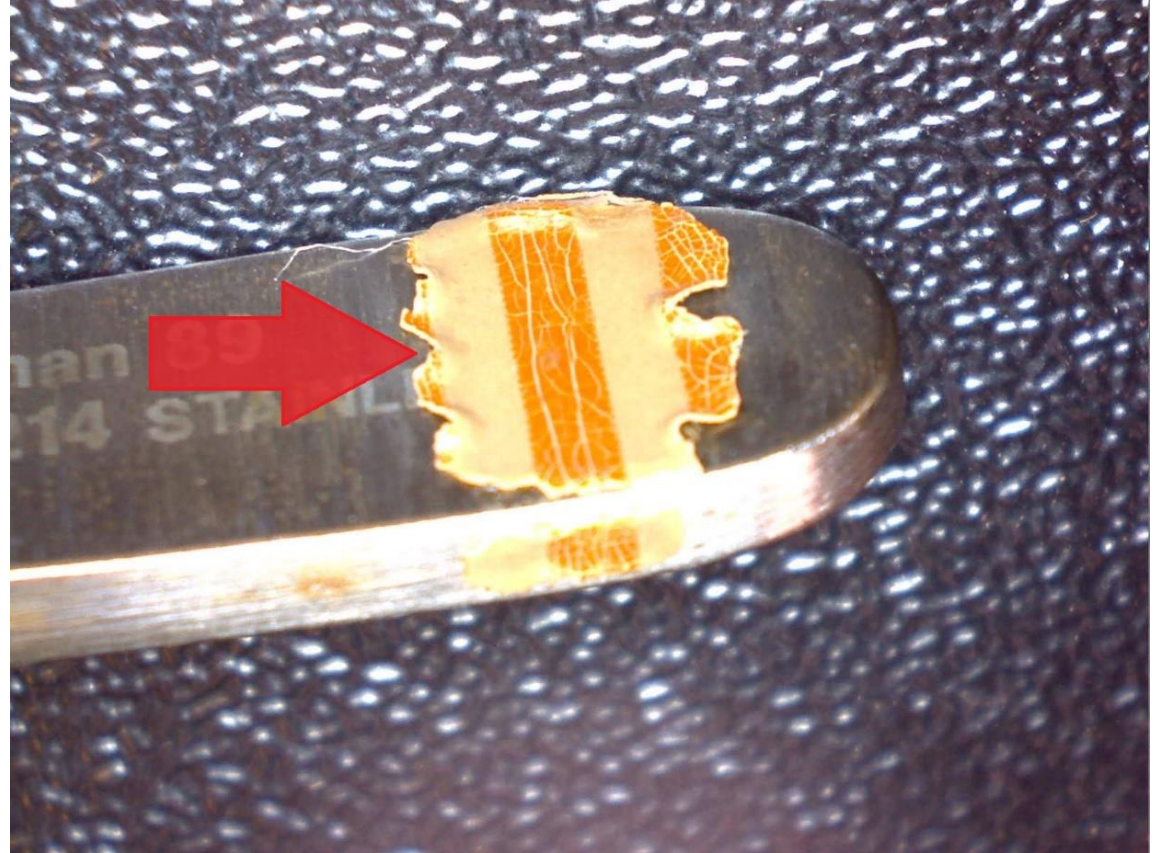
The type of information that will help your repair vendor expedite your repair are the following:

1. Where is the instrument broken?
2. What is the specific issue?
3. How did it occur?
4. Is there a specific surgeon having difficulty with the instrument?

The rule of thumb: the more information you have on the broken instrument, the better!

Instrument Marking

- Instrument tape or color dipping that is damaged or flaking must be removed
- Instrument tape should only wrap around 1-1.5 times
- Instrument tape should not be applied to ring portions of ring-handled instruments
- Area of increased focus by inspectors!



Summary

Instrument Care and Handling, Inspection and Testing is critical to patient safety and the longevity of surgical instruments.



For additional resources please review IAHCMM 8th Edition CS Manual pages 179-201

Thank you!