Advancement In Surgical Instruments and Challenges in Reprocessing

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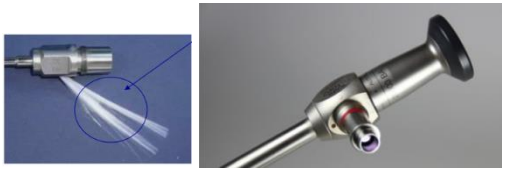
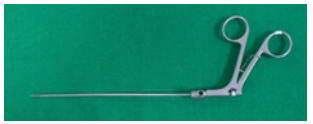
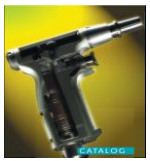
Objectives

- Technology creates processing challenges
- Evolution in surgical instruments
- The CSSD challenges in instruments processing
- Validation process of advance instruments
- How to protect advance instruments ?
- Inspection and Testing of advance instruments

Technology Creates Processing Challenges

Advancement in technology have created new and more sophisticated instruments that are very complex in design, and made from a variety of different materials.
These devices creates processing challenges because :-

Fragile :- Lenses, Fiber optics, 	Most of them are not detachable at all ioints Luer Lock, Several Small Moving Parts 
Complex  Compact 	Heat Sensitive Insulation Ball Socket Joint 
Long & Narrow lumen 	Multiple Internal Channels & Ports 
Multiple joints / Crevices / Rough surface Break Wires 	With Electrical Circuit 
Turbines, Shafts, Gears, Ball bearing, Bush, Pins, Washers, Springs, Rings, etc.  	Electronic / Moist sensitive / Costly 

Comparison Of …

OPEN SURGERY

MIS SURGERY

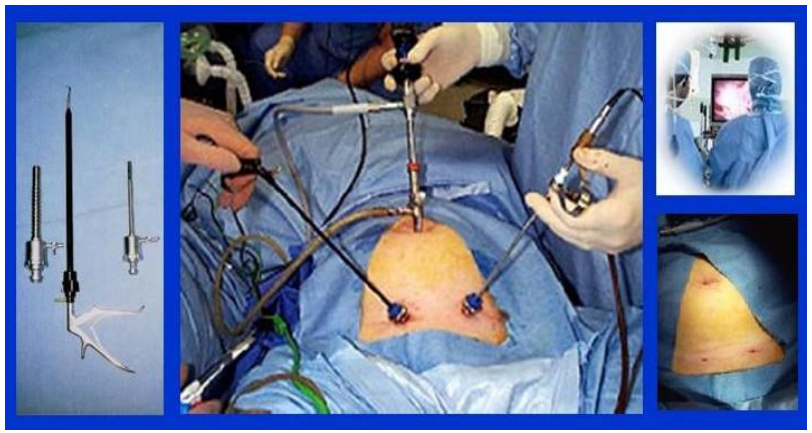
"Man is a Tool -using Animal ….without Tools he is nothing, with Tools he is all"

------ Thomas Carlyle, 1896

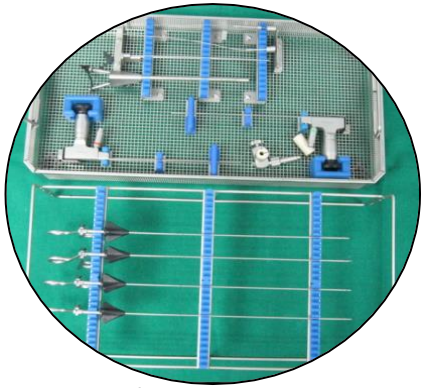
Surgical techniques such as Minimal-invasive, Non-invasive and Robotic surgery come into demand

As surgeons and patients realize the benefits of :--

- Smaller incisions
- Reduced tissue trauma
- Decreased need for blood transfusion
- Shorter hospitalization
- Faster recovery
- Less chances of infection
- Less post operative pain
- Hernia rarely occur
- Maximum utilization of bed
- Some surgeries operating through the natural port



Evolution in Surgical Instruments



Neuro endoscopy Instruments

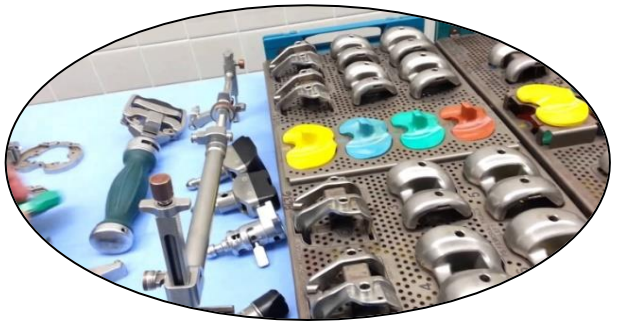
Arthroscopy Instruments

Laparoscopy Instruments

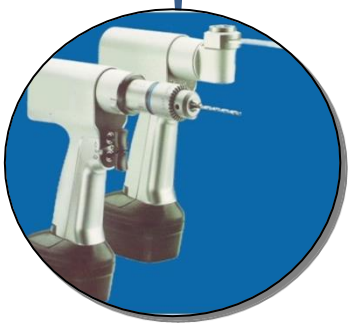
General Instruments

Navigation Instruments

Robotic Instruments



Joint Replacement Instruments



Power Equipment

Endoscopic Instruments

The CSSD Challenges :

- **Do It Fast**
- **Do It Right**
- **Keep Patients Safe**
- **Keep Staff Safe**

Today's Challenges in instrument reprocessing

- New instruments introduce on a regular basis.
- Keep up with change
- Ready for newer technology
- Advanced sterile processing equipment
- Changes in Device Regulation
- Manufacturers' Instructions for Use are being changed
- Skilled manpower
  - Trained, efficient and competent staff

Loaner instruments and processing challenges

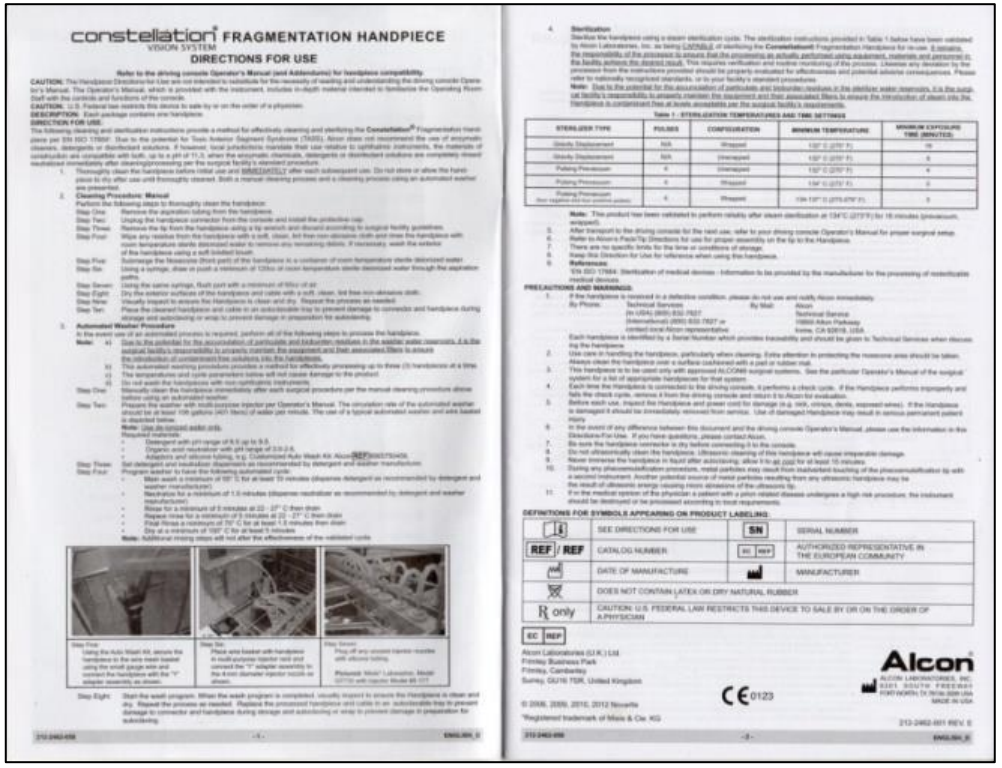
These instruments have complex anatomy and very different from our normal instruments

Most of the time : -

- Insufficient time for reprocessing
- IFU is not available
- Set weighing more than 25 pounds
- Not well perforated Trays

IFU – Instructions for Use

- Precautions and warnings
- Installation method
- Instruction for cleaning & disinfection
- Instruction for sterilization
- Special care to be taken
- How to protect ?
- Potential safety hazards



constellation® FRAGMENTATION HANDPIECE
VISION SYSTEM
DIRECTIONS FOR USE

Validation of process where instruments are reprocesses in healthcare facilities according to EN ISO 17664.

Information for reprocessing to be provided by the manufacturer

- The effort for cleaning and sterilization depends on its design
- There are few instruments which cannot be cleaned and sterilized correctly because of a wrong design
- According to EN ISO 17664 the manufacturer of a reprocessable instrument has to provide at least two reprocessing methods
- The instruction for use have to include a function test, cleaning, disinfection and sterilization procedure in detail
- The described methods must be effective i. e. they must be validated and a test report proving the validation report according to EN ISO17664

I am Special ….

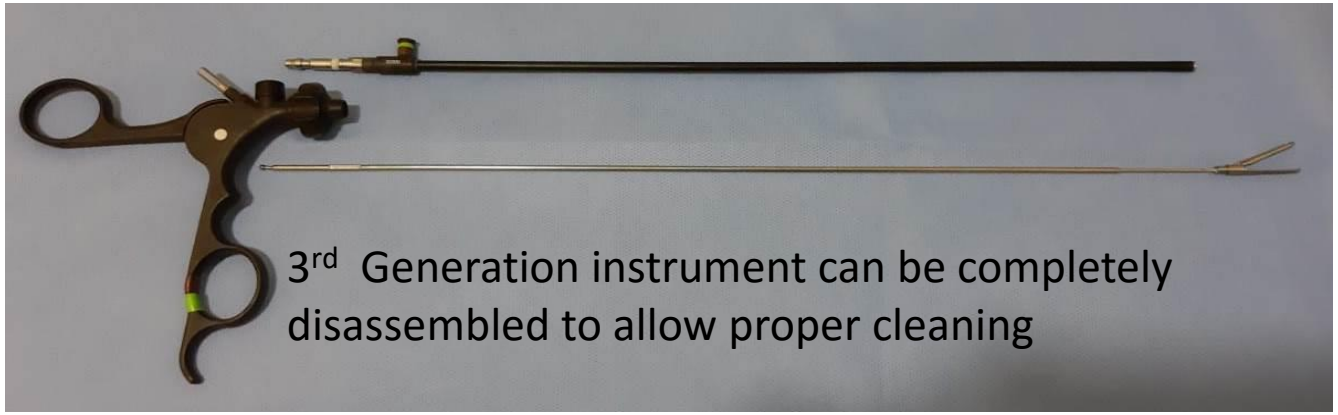
What we know is “Special”

- Disassembling
- Extensive manual cleaning
- Specific cleaning agents
- Specific lubricant
- Specific instructions
- Recommended Sterilization cycles
- Special Functionality test
- Repairs
- Inventory Management

Reprocessing of speciality instruments

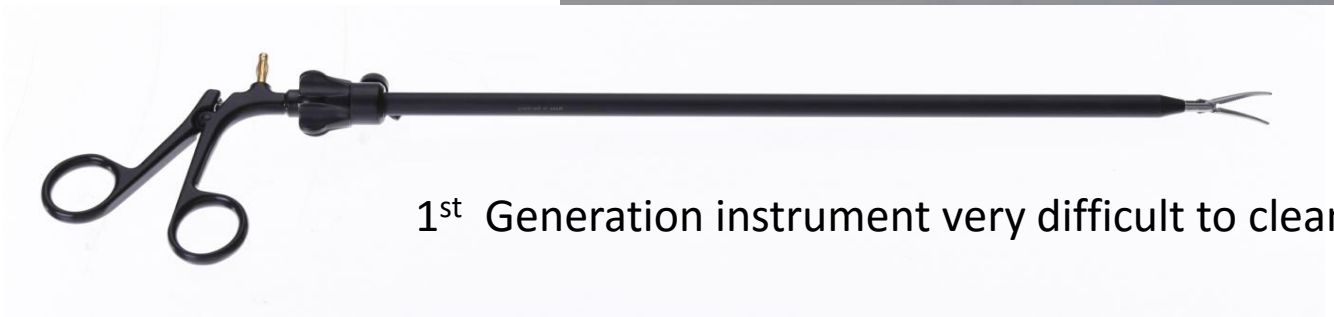
- Possible injuries from damaged instrument
- Financial investment to healthcare facility
- Life of instruments prolong
- Incorrect reprocessing - HAI risk
- Bio Film Formation

Generation of Laparoscopic Instrument



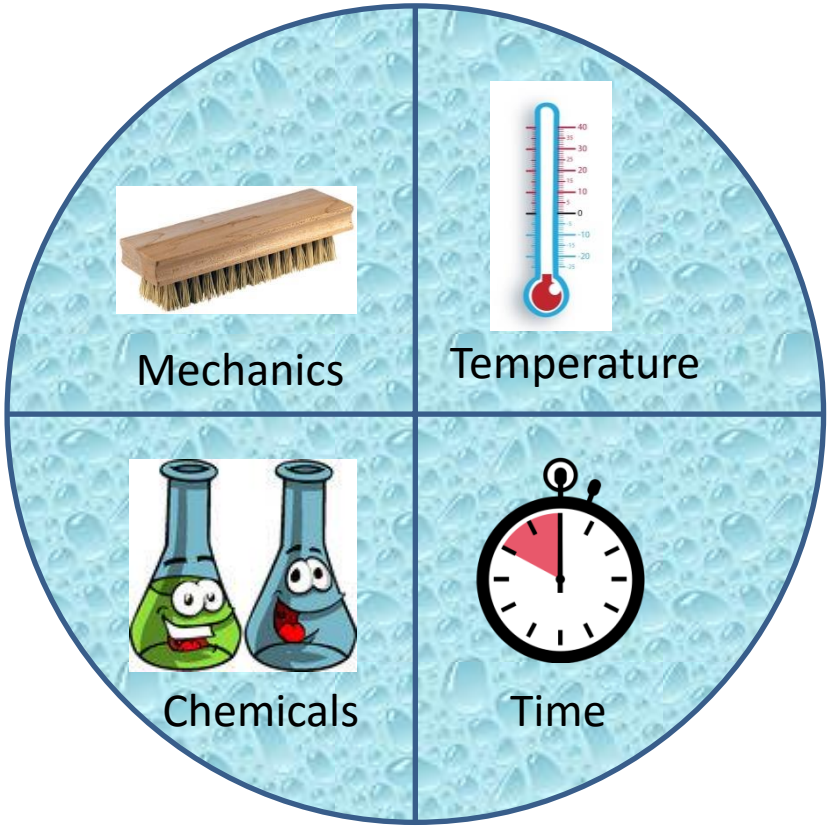
3rd Generation instrument can be completely disassembled to allow proper cleaning

2nd Generation instrument with cleaning port



1st Generation instrument very difficult to clean

Description of the cleaning procedure
Sinner Circle

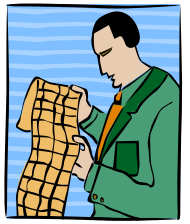


- Herbert Sinner has described cleaning as interaction of 4 variables which complement each other
- If one value decreases, another value must increase to retain the cleaning efficacy

* 1900 in Chemnitz, †1988 in Hilden, Germany, former cleaning agent application technology manager of Henkel

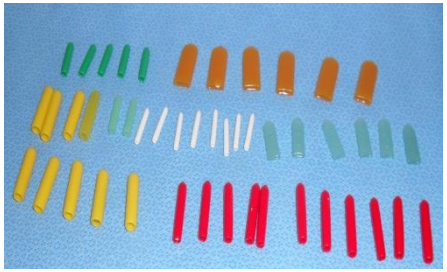
Patient Safety begins with documentation

- **Documentation**
  - Proper documentation
- **Policies / Guidelines / Standards**
  - Clearly written policies, guidelines and standards
- **Procedures**
  - Recommended procedures
- **Orientation**
  - Every one oriented by competent trainer
- **Training and Education**
  - To make efficient and competent CSSD staff
- **Video clip for training**
  - For easy to understand process



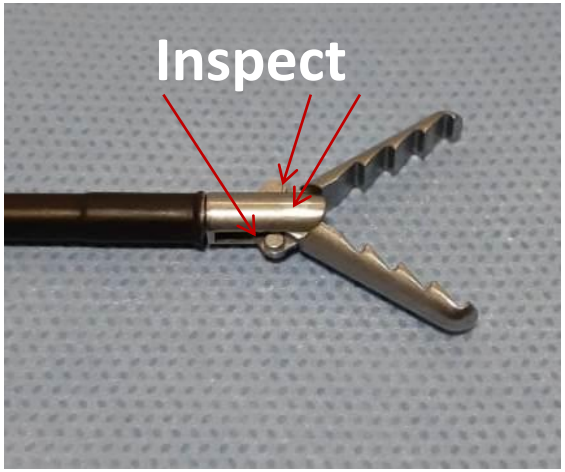
How to protect instruments ?

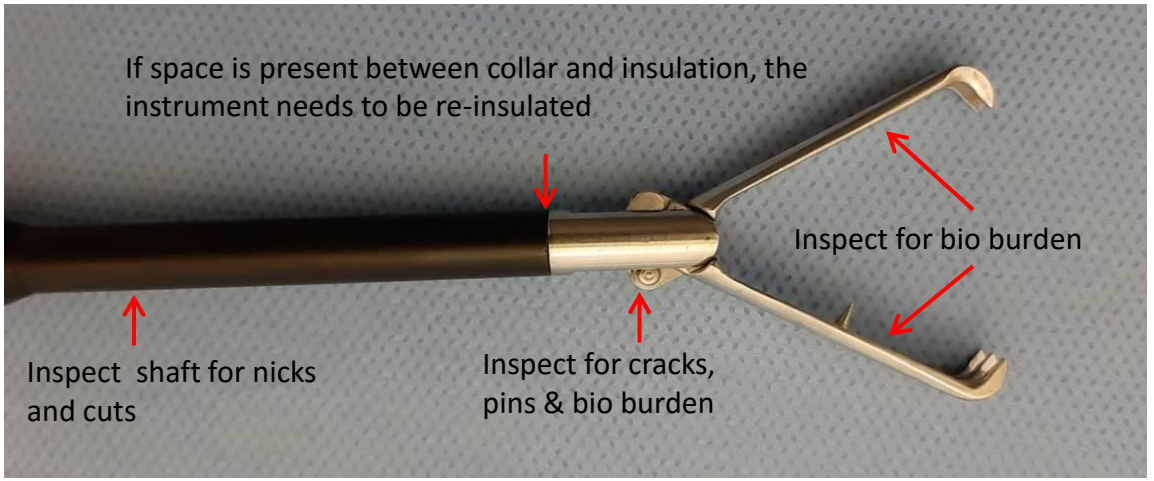
- Clean instruments as soon as possible
- Always keep instruments in wet condition before cleaning
- Protect during transportation
- Avoid exposure of saline
- Place heavier instruments at bottom and lighter at top
- Keep all scopes separately
- Use surgical instruments for their intended use only
- Protect delicate, fine and sharp instruments

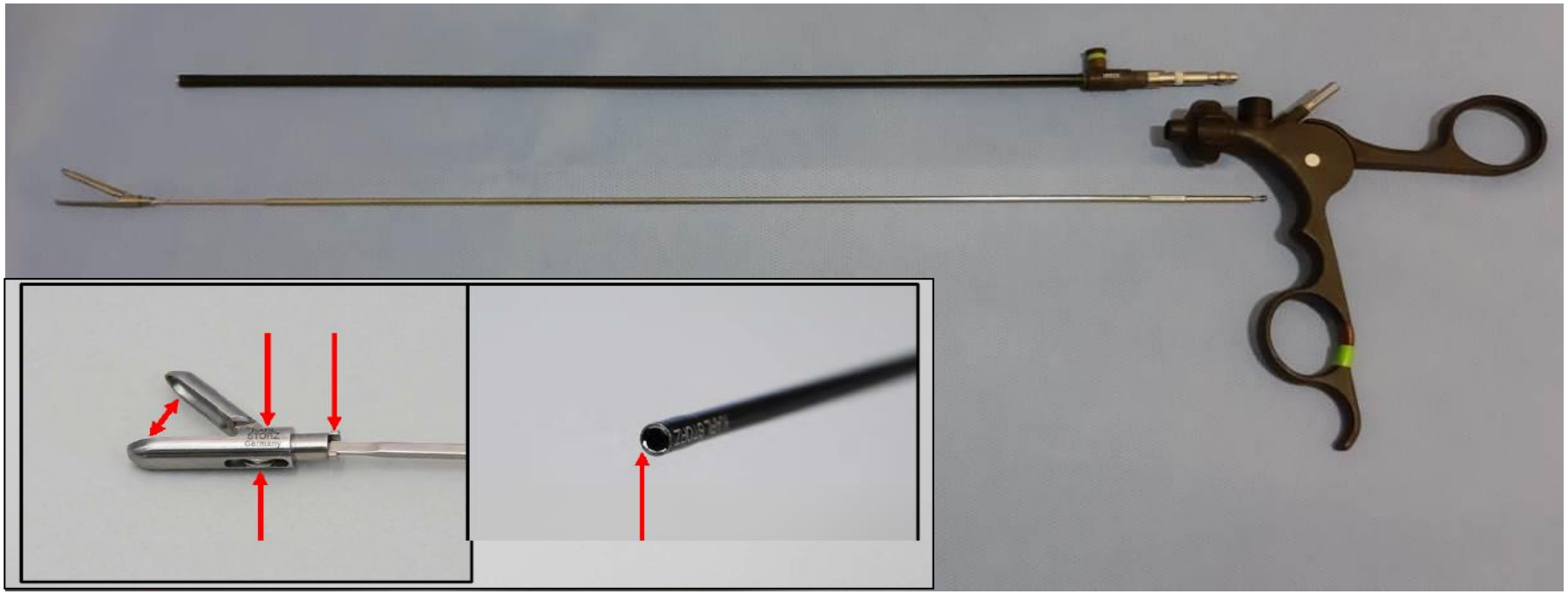


Tip Protector

Inspection, Testing & Cleaning

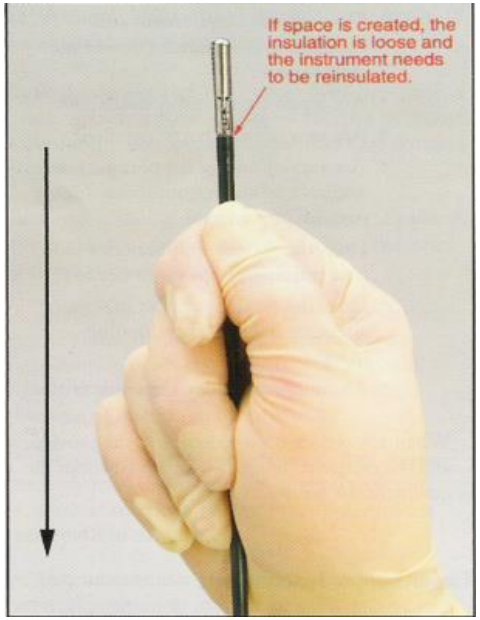


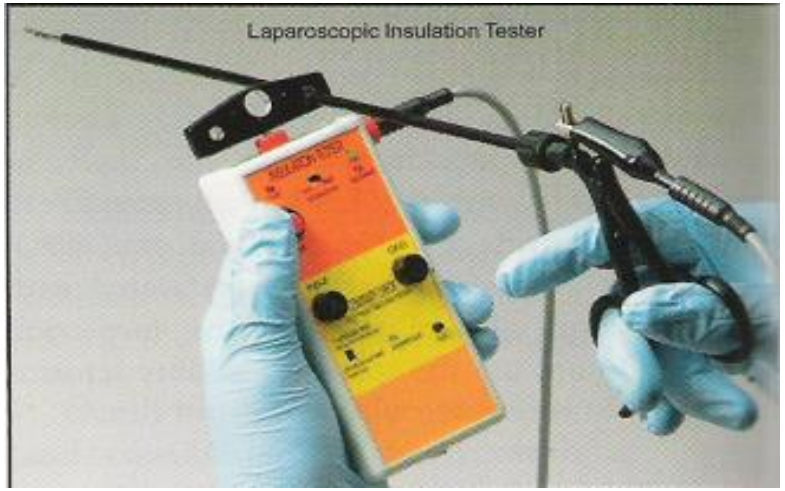


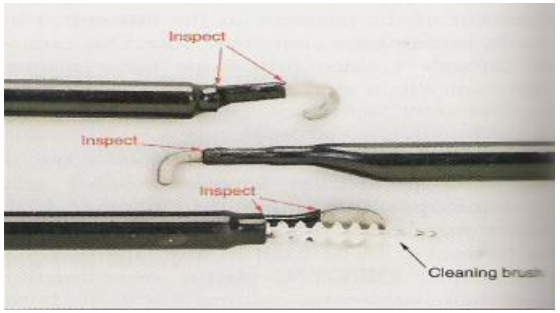


Inspection of Laparoscopic Instruments

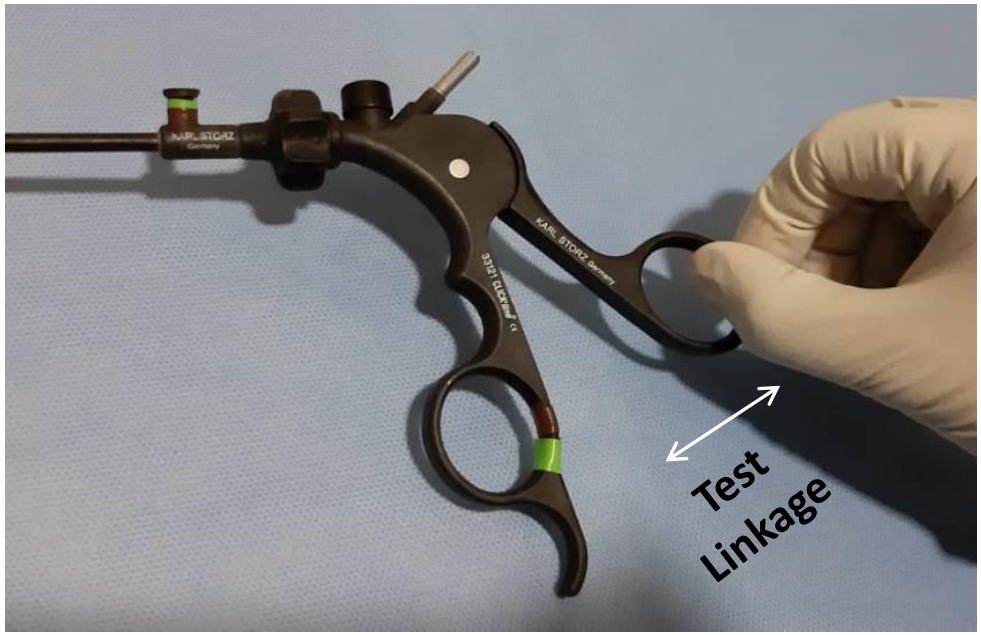
- The insulation of these instruments is very susceptible to :- pin holes, cracks, tears, overall loosening
- The inspection :- Distal tip and Collar
- Inspection for insulated handle :- Chipping or Crack







Inspection & Testing



Insulated Handle :- **Chipping or Crack**.

Inner Linkage :- **worn, stretched, or fatigued, wiggle the drive ring back and forth**

Inspection & Testing

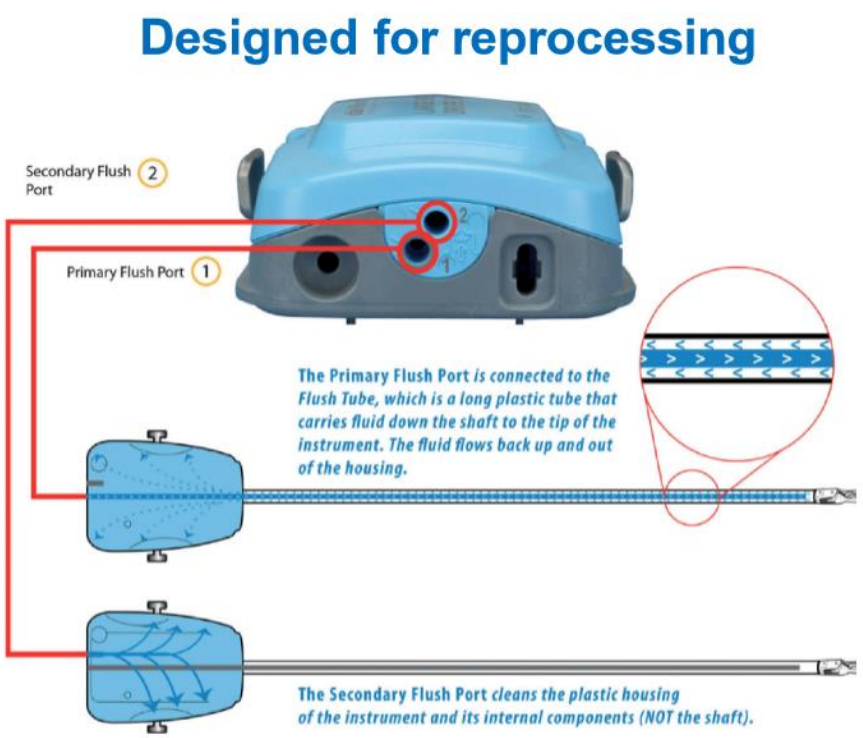
To test sharpness of a standard laparoscopic scissor

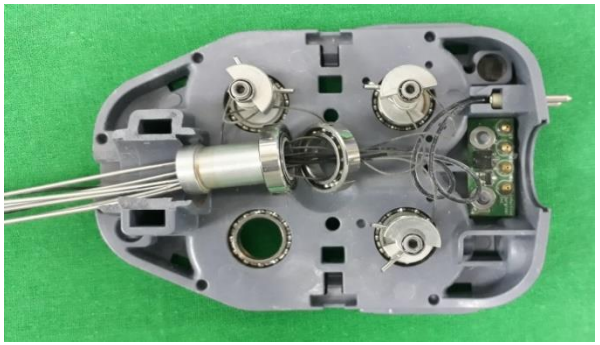
- Blades should cut cleanly through one thickness of facial tissue
- Blades should open and close smoothly and be free of nicks and burrs

To test sharpness of a laparoscopic hook scissor

- Blades should cut cleanly through a standard, 1/4” wide rubber band
- Blades should open and close smoothly and be free of nicks and burrs

Robotic Instruments – Why Challenging ?





Conclusion

- If we process these advance instruments by following :-
  - Standard Protocol / SOP’s
  - Guidelines
  - IFU
  - Proper Documentation
  - Orientation and Training
  - Instruments anatomy
  - Instruments functions and mechanism

- References :-

1. Saifee Hospital, CSSD SOP (Data on file)
2. Central Service Technical Manual, 7th edition, IAHCSMM
3. Recommended Guide lines for CSSD –

   Hospital Sterile Services Association (INDIA)
4. Spectrum

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