Are Your Microsurgical Instruments Patient Ready?

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Course Objectives

✓ Understanding the importance of your role in the care and handling of microsurgical instruments

✓ Understand the importance of the CSPD in patient safety, surgeon satisfaction and cost controls

✓ Review of instrument categories

✓ Discuss the what and why of the inspection process

✓ Identifying instrument issues…
History

• Ophthalmology was first mentioned in 2250 B.C.
• Hippocrates was the father of Ophthalmology

1. Images displayed courtesy of www.phisick.com
History

Cataract set circa Early 18th Century

2. Exhibition ophthalmologic surgical set by Aubry, (ca. 1880)
Images displayed courtesy of www.phisick.com
Today

• All Microsurgical Instruments to greater or lesser extent are Handmade.
  • Forgings
  • Stampings
  • Machining
Why is this important?

• PATIENT CARE
• Cost of general/specialty instruments
  – General surgery set
    • $4,000 average
  – Handheld Ortho, CV, Neuro instruments
    • $300 average each – including rongeurs and bone biters
• Cost of microsurgical instruments
  – Middle ear set
    • $6,000 average
  – Cataract set
    • $6,000 average
  – Single microsurgical instrument
    • $500 average – delicate needle holders, forceps
Inspection of Micro Instruments

Inspection Basics

- Lighted magnifying loupes
- Hand held lighted magnifying glass
- Testing media for scissors
- High quality lighted magnifying lamp
Micro Instruments

- Must use appropriate magnification (after all, this is how the surgeon sees them!)

- Two types of grip = flat handle and knurled round handle...why?
Inspection of Ophthalmic Instruments

Inspection Basics

It is CRITICAL that the CSPD professionals inspecting and assembling micro instrument sets are thoroughly trained and regularly assessed for competency.

Ongoing mandatory training should be scheduled to address new technology and current events in the industry.

Communications between the OR and SPD should be established sharing information...

We will review inspection criteria on the following slides.
Inspection

*Always use Magnifier*
- Burrs on tips?
- Nicks on cutting edges?
- Improper alignment of jaws, shafts, blades?
- Condition of tungsten carbide inserts?

Remember, what you are *not* seeing with your naked eyes, the surgeon *is* seeing under a microscope or a magnifier.
Inspection Guidelines

*New instruments should always be checked before use*

- Damage in shipment
- Damage in packaging
- MUST BE PROCESSED AS ‘DIRTY’ BEFORE USE

- Ring-handled forceps
  - Minute cracks in the box locks
  - Misaligned jaws
  - If serrated, assure proper mesh on closure
  - If toothed, ensure teeth are not broken, mesh properly
  - Assure ratchets/shanks are set properly.
    - Tips should meet on first ratchet with a definite click
Guidelines continued

• Scissors
  – Roughness or burs at the scissor tips
  – Broken or bent tips
  – Nicks in the cutting edges
  – Worn or loose fulcrum screws
    • Can prevent smooth cutting action
Inspection

Micro Scissors:
• Theraband (yellow) to test scissors
• Use a cotton ball to test for burrs in cutting edge

NOTE: *If using a cotton ball to test for burrs, ensure you remove any cotton fibers left on instrument from the inspection!*
Guidelines continued

• Needle Holders
  – Signs of wear on the serrations
    • Clamp a needle in the jaws by locking the second ratchet
    • If needle can be turned, then repair of holder needed
  – Other inspections same as for ring handled instruments

NOTE: Check to ensure locking mechanism in handle engages properly
Guidelines continued

• Picks, knives
  – Inspect for burrs and nicks
  – Check for bends or cracks

• Hooks
  – Misalignment
  – Burrs or breaks
Guidelines continued

• Rongeurs
  – Proper alignment
  – Fulcrum screws, as applicable
  – Smooth cutting action
  – Sharpness of blades, cups
Guidelines continued

- **Suctions/Irrigators**
  - Smooth tips
    - Even microscopic sharp/nicked tips can damage delicate patient tissue (check with cotton ball)
  - Stylet available

- **Retractors**
  - Wire uncompromised
Inspection of Micro Instruments

Due to the size of microsurgical instruments, special equipment must be used by repair specialists to examine and determine necessary repairs.

The following slides will help us better understand the need for close inspection of all instruments and periodic tray maintenance by a qualified repair specialist.
Inspection of Micro Instruments
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Inspection of Micro Instruments
Inspection of Ophthalmic Instruments

Scissor points are extremely delicate; the tips should not be touched.
Inspection of Micro Instruments

Note the difference in size of ophthalmic scissors.
Inspection of Ophthalmic Instruments

Note the bi-polar cautery forceps.
Inspection of Ophthalmic Instruments

Ophthalmic retractors and fixation instruments
Inspection of Ophthalmic Instruments

Retractors, knife handles and various nerve hooks must be inspected for wear and damage that may cause unintended trauma during use.
Golden Rule!!!

Always follow the device manufacturers written instructions!
Cleaning

• Must begin in the O.R.
  – Wipe debris as used
  – Immediately after surgery
    • Keep moist
    • Utilize enzymatic or pre-cleaning solution
  – Assure proper transportation
    • Lighter instruments on top
    • Segregate sharps
Cleaning

• Decontamination
  – Enzymatic
  – Sonic: dB level is different than with general instruments
  – Washer Decontaminator
    • Always follow manufacturers instructions specific to micro-instruments
  – Standard instrument practices
    • Take apart whenever possible
  – Special care for knurled or milled grooved handles

• Lubrication is critical!
The ASORN Cleaning Process: An Overview

The instrument cleaning process needs to begin in the operating room.

Instruments must be wiped off after use to keep ophthalmic viscosurgical solutions from drying.

Hand pieces should be flushed with, then soaked in, sterile water off the sterile field in the OR until they can be properly cleaned and decontaminated.

3,4. Schuyer, D. The risk of TASS makes proper instrument handling procedures more important than ever. ESCRIS EuroTimes, July-September 2007.
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Special Consideration!

Ophthalmic viscosurgical solution, which can dry and harden within minutes, should not be allowed to dry on the instruments.
The ASORN Cleaning Process: An Overview

- The next step is decontamination, which means bringing the instruments to a soiled utility room for mechanical cleaning with a soft bristled brush.

- Hand pieces should be flushed with 120 to 150 cc of water according to the manufacturer's instructions and dried with forced air or medical-grade nitrogen.

- There should also be a visual inspection of each instrument.

7 Schuyer, D. The risk of TASS makes proper instrument handling procedures more important than ever. *ESCRS EuroTimes*, July-September 2007.
The ASORN Cleaning Process: An Overview

- After decontamination the instruments should be cleaned according to the manufacturer's instructions.

- For most phacoemulsification and I/A hand pieces, this means avoiding the use of ultrasound machines, enzymatic cleaners and detergents and simply flushing with sterile, distilled or deionize

The ASORN Cleaning Process: An Overview

1. Adequate time for thorough cleaning and sterilization of instrumentation should be established.

2. For each piece of equipment, the manufacturer’s directions for use pertaining to cleaning and sterilization should be followed.

3. Whether they are used or not, instruments opened for a procedure should be transported from the OR in a closed container to the decontamination area and cleaned immediately.
The ASORN Cleaning Process: An Overview

5. Disposable cannula and tubing should be used whenever possible, and they should be discarded after each use.

6. Devices labeled for “single use only” should not be reused. (Single-use devices do not include instructions for reuse or reprocessing. Third-party and hospital re-processors of single-use devices are subject to additional regulatory requirements as specified by the FDA.)
The ASORN Cleaning Process: An Overview

7. To avoid contamination with bio-burden and cleaning chemicals, intraocular instruments should be cleaned separately from non-ophthalmologic surgical instruments.

8. The importance of enzymatic detergents for the cleaning of soiled intraocular instruments has not been established. Inappropriate use and incomplete rinsing of enzymatic detergents have been associated with outbreaks of TASS (Toxic Anterior Segment Syndrome).
To avoid contamination with bio-burden and cleaning chemicals, intraocular instruments should be cleaned separately from non-ophthalmologic surgical instruments.

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When flushing is used as part of a cleaning technique, the effluent should be discharged into a sink or separate basin so the fluid is not reused. Don’t Double-Dip!!!
Packaging

• Assure instruments are dry
• Utilize tip guards/protective pouches wherever possible
• Utilize silicone mats in bottom of trays
• Racks specific for holding microsurgical instruments
• Trays designed for holding microsurgical instruments
The ASORN Cleaning Process: An Overview

The final step is sterilization
• Sterilization of intraocular instruments must be done according to manufacturers’ DFU’s

• Verification of sterilizer function should be completed at least weekly, preferably daily

• Preventive maintenance, cleaning, and inspection performed on a scheduled basis, according to the manufacturer’s written instructions

6 Schuyer, D. The risk of TASS makes proper instrument handling procedures more important than ever. *ESCRS EuroTimes*, July-September 2007.
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### Sterilization; The Spaulding System

<table>
<thead>
<tr>
<th>Classification</th>
<th>Definition</th>
<th>Processing Type</th>
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<tbody>
<tr>
<td>Critical</td>
<td>Contacts sterile tissue or is introduced into the bloodstream</td>
<td>Sterilization</td>
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| * Surgical instruments  
* Implants  
* Needles  
* Cardiac and urinary catheters |                                                                         |                          |
| Semi-critical     | Contacts intact mucous membranes                                          | High-level disinfection  |
| * Bronchoscopes  
* Gastrointestinal endoscopes  
* Anesthesia equipment  
* Cystoscopes |                                                                         |                          |
| Non-critical      | Contacts intact skin                                                      | Low-level disinfection   |
| * Blood pressure cuffs  
* Tourniquets  
* Utensils such as basins  
* Equipment and furnishings |                                                                         |                          |

Sterilization

• Low heat is best
  – High temps shorten the life of delicate instruments
• IUSS very harmful
  – Dulls sharp edges
  – Causes rapid degeneration of micro-parts
• Mixing metals
  – Microsurgical instruments are more susceptible to electrolytic chemical reactions
  – Instruments will appear to have rusting
  – Segment any chrome plated or titanium instruments from stainless steel
I don’t always drop instruments...

...but when I do, it is right before the surgeon needs it. Stay sterile my friends.
Review  (Class Participation)
CSPD professionals inspecting and assembling microsurgical instrument sets must be:

- **A:** Thoroughly trained at hire
- **B:** Regularly assessed for competency
- **C:** Have their training, initial and ongoing, documented
- **D:** All the above
CSPD professionals inspecting and assembling microsurgical instrument sets must be:

- Thoroughly trained at hire (A)
- Regularly assessed for competency (B)
- Have their training, initial and ongoing, documented (C)
- All the above (D)
Due to technology, virtually all surgical instruments today are:

- A: Stain Free
- B: Easily repaired by SPD
- C: Replaced cheaper than repair
- D: None of the above
Due to technology, virtually all surgical instruments today are:

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Why should ophthalmic scissors not be touched with bare hands during the inspection process?

- A: Cut your self
- B: Bend the tips
- C: Leave behind microscopic biological debris
- D: You can touch the tips
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When cleaning microsurgical instruments, what documentation processes should be followed?

- A: Instructions from detergent
- B: Instrument manufacturer DFU’s
- C: Established facility training program
- D: SDS and fact sheet
When cleaning microsurgical instruments, what documentation processes should be followed?

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B: Instrument manufacturer DFS
C: Established facility training program
D: SDS and fact sheet
When flushing is used as part of a cleaning technique the effluent...

- A: Should be re-used until visibly dirty
- B: Should be discharged into a sink or separate basin
- C: Can be recycled
- D: None of the above
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- None of the above
Decontamination of micro instruments begins...

A: In the decontamination area
B: when the instruments can be mechanically cleaned
C: Only by CSPD staff
D: At the point of use
Decontamination of micro instruments begins…

- A: In the decontamination area
- B: when the instruments can be mechanically cleaned
- C: Only by CSPD staff
- D: At the point of use
What media would be best suited to test for ‘burrs’ in the cutting edges of micro-instruments?

A: Cellophane
B: Cotton ball
C: Yellow Theraband
D: Tissue paper
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Ophthalmic visco-surgical solution is harmless to the instrument and easily removed during the cleaning process…

A: True
B: False
C: 
D: 
Ophthalmic visco-surgical solution is harmless to the instrument and easily removed during the cleaning process...
To best serve our patients, it is strongly suggested that a coordinated training effort be established between the OR and CSPD professional staff.
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A: True

B: False

C: 

D: 
**Summary**

Microsurgical instruments are a large investment and with proper care and handling, we can support better patient procedure outcomes, extend the life of the instruments and support the cost concerns of our facility.

SPD professionals with a keen understanding and continued education can have a major impact on microsurgical instrument processing and the safety of the patient.
References

1. Aubry (ca. 1880) Exhibition ophthalmologic surgical set, Images displayed courtesy of www.phisick.com

Safety in CSPD

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Congratulations!