OPHTHALMIC INSTRUMENTATION

LEARNING OBJECTIVES

1. Explain the cleaning process for ophthalmic instruments
2. Describe basic ophthalmic instruments and the processes for their inspection and assembly
3. Discuss the sterilization process for eye instrumentation

Instrument Continuing Education (ICE) lessons provide members with ongoing education in the complex and ever-changing area of surgical instrument care and handling. These lessons are designed for CIS technicians, but can be of value to any CRCST technician who works with surgical instrumentation.

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YES TRANSLATE LIGHT INTO VISION. MANY PEOPLE TAKE THEIR sense of vision for granted until it becomes diminished or jeopardized. Safety and mobility are impacted when our ability to see is compromised, and the total loss of vision can be devastating. This lesson plan addresses ophthalmic surgical instruments and highlights the importance of proper handling, cleaning and inspection of ophthalmic instruments to keep the devices well-functioning and prevent eye injury in surgical patients.

OBJECTIVE 1. EXPLAIN THE CLEANING PROCESS FOR OPHTHALMIC INSTRUMENTS

Eye instruments are very small and delicate with very fine distal tips that can easily be damaged from routine handling. It is always important to carefully follow the most current manufacturer’s Instructions for Use (IFU) when handling these instruments to help prevent damage. The human eye is also very sensitive and reacts to foreign material that can remain in improperly cleaned instruments. Note: Toxic Anterior Segment Syndrome (TASS) is an inflammatory response to this foreign material that can cause severe complications after surgery.

Gross debris on ophthalmic instruments should be removed, and instrument lumens should be flushed with sterile distilled water or another suitable agent, as recommended by the manufacturer during and immediately after the surgical procedure. The instruments should also be carefully placed into their transport container, taking care to protect them from damage during transport. It is important to keep eye instruments moist during transport, so any remaining soil will not dry on them. When possible, eye instruments should always be processed separately from other surgical instruments to reduce the potential for cross-contamination from material or other residue on the other instruments. Only cleaning agents recommended by the instrument manufacturer should be used during the cleaning process. Cleaning solutions should be diluted following manufacturer’s IFU. When presoaking, avoid stacking eye instruments on top of each other, which can cause damage.

Carefully clean all tips, crevices, box locks, and serrations using materials specifically designed for use on ophthalmic/microscopic instruments. All lumens should be brushed and irrigated to remove any debris. Instruments must be thoroughly rinsed following the manufacturer’s IFU. Cleaning solutions, rinse water, and disposable cleaning tools and syringes used for eye instruments should be discarded, as recommended by the manufacturer.

Reusable cleaning tools should be...
cleaned and decontaminated after each use, according to the manufacturer’s IFU. Many eye instruments cannot withstand mechanical cleaning, and if instruments are only manually cleaned, they should be carefully inspected with a magnifier for cleanliness after rinsing.

Ultrasonic cleaning is effective in removing soil from hard-to-reach areas; however, eye instruments should only be processed in an ultrasonic cleaner if that process is approved by the instrument’s manufacturer.

The ultrasonic cleaner should be filled and cleaning chemicals should be mixed as close to the time of use as possible. Allowing the solution to sit unused inside an ultrasonic cleaner for long periods of time may result in the creation of endotoxins, which can be a cause of TASS. Instruments should be placed in an ultrasonic cleaner in a manner that keeps them from becoming damaged from the cavitation process; they should not be stacked on top of each other.

Note: cavitation is the process used by an ultrasonic cleaner in which low-pressure bubbles in a cleaning solution burst inward to dislodge soil from instruments.

Following ultrasonic cleaning, the instruments should be carefully rinsed and inspected for cleanliness. ANSI/AAMI ST79, Annex N, states that the solution should be changed at least daily, but, preferably, after each use. When changing the cleaning solution, the ultrasonic cleaner should be rinsed, cleaned and dried before adding more solution.

Delicate eye instruments should not be processed in a washer-decontaminator, unless recommended by the instrument’s manufacturer. If a washer-decontaminator is used, always follow the instrument manufacturer’s IFU regarding proper cycles.

OBJECTIVE 2: DESCRIBE BASIC OPHTHALMIC INSTRUMENTS AND THE PROCESSES FOR THEIR INSPECTION AND ASSEMBLY

Ophthalmic instrument inspections should be done using some form of magnification to ensure the instruments are clean and damage-free. Many eye instruments look similar to those used in other specialties, so it is very important to ensure the proper instruments are placed into the sets. Each instrument type may have different inspection points, so becoming familiar with these instruments is a must for a CIS technician.

Eye scissors, like all ophthalmic instruments, are very delicate. Blades must be inspected carefully under magnification for nicks, burrs and sharpness. Also, inspect box lock areas for cleanliness, ensure the screw is in place, and confirm there are no stress fractures. Most eye scissors should be processed in the ultrasonic cleaner, but they are usually not recommended for washer-decontaminator processing as they may become damaged. Tips should be protected to avoid damage, and these instruments should be packaged in a manner to protect them from damage. Common ophthalmic scissors include Castroviejo, Vannas (see Photo 1), Westcott, and Enucleation.

Forceps used in ophthalmic surgery may be utilized in many other types of procedures, especially those for plastic surgery. These forceps are fine-tipped and should be carefully inspected to ensure they are clean and functional. They are very delicate and most are not recommended for washer-decontaminator processing as they may become damaged. Tips should be inspected to ensure they meet when closed and are burr-free. All serrations should be inspected for cleanliness, and the proximal end should be checked for stress fractures. The delicate tips of the forceps should be protected when packaging. Common forceps include Lens Tying forceps, Jewelers, Bishop Harman, Lens insertion, Arruga Capsule (see Photo 2), and Bipolar.

Clamps hold small vessels and suture, and they are used to hold and turn the eyelid during surgery. Shapes and sizes vary depending on their intended use. Be sure the tips are in the open position while the instrument is in the ultrasonic cleaner. Carefully inspect their fine tips for cleanliness and to ensure they meet evenly. Make sure all screws are intact and not loose. Some clamps are very small and should be packaged in a way that they do not become lost in the tray. Common clamps include Serrefine Bulldog (see photo 3) and Chalazion (see photo 4),
Retractors, also called speculum, hold the eyelids open during surgery and/or hold tissue away from the operative site. Designs vary from small delicate wire-type retractors to solid stainless steel hand-held instruments. Check the manufacturer’s IFU for specific cleaning and packaging requirements. Carefully inspect tips to ensure they are intact, and ensure wire retractors are not bent or damaged. Carefully package wire retractors to protect them from damage from other less delicate instruments. Common retractors include Barraquer speculum (see Photo 5) and Desmarres eyelid retractor (see Photo 6).

Needle holders found in ophthalmic instrument sets are also frequently found in vascular sets. These needle holders are usually spring action and five to six inches in length. Care must be taken when handling these instruments because they are very delicate. Always check the tension of the spring action to ensure the needle holder is in proper working order, and ensure the jaw insert is securely in place. Processing needle holders in a washer-decontaminator may not be recommended, so it is important to check the manufacturer’s IFU for proper processing instructions. Also, check the box locks for cleanliness, ensure the screw is intact, and confirm there are no stress fractures. Protect the tips when packaging. The Castroviejo Needle holder (see Photo 7) is an example of this type of instrument.

Lacrimal probes (see Photo 8) are used to dilate or probe the lacrimal ducts (tear glands) and are often made from silver to make them easily bendable and pliable. Most lacrimal probes are five inches in length, double-ended, and are available in sizes from 0000 through 8. Many probes have olive-shaped ends. Manual cleaning is necessary and, if an ultrasonic cleaner is used, it is best to separate these probes from stainless steel instruments to prevent damage or corrosion. Inspect the probes for cleanliness, ensure their shafts are straight and intact, and examine them under magnification to ensure there are no cracks in the shafts. Check to ensure all sizes requested are present in the set. When packaging, protect these instruments from bending or becoming caught in the tray mesh.

Calipers (see example in Photo 9) are used for the precise measurement of the structures of the eye including cornea and pupils. When closed, they resemble a closed V-shape with very fine distal tips and a horizontal measuring bar at the distal tips. The center of the caliper has a screw-type device to hold the distal tips open or closed, and the box lock area has a large holding screw. When closed, the distal tips should evenly meet and be nick- and burr-free. Clean calipers following the manufacturer’s IFU using extreme care. Inspect them with a magnification device. Note: inspection points include ensuring that the distal tips are clean and intact. Check the box lock screw to ensure it is intact and clean. Also check the locking screw area for cleanliness and function and protect the tips when packaging.

Phacoemulsifier hand pieces (see Photo 10) create ultrasonic vibrations, and are used to emulsify and remove cataracts during cataract surgeries. They resemble small powered surgical saws with power cords attached. Strict adherence to the manufacturer’s IFU for cleaning, rinsing and sterilizing these devices is vital for successful surgical outcomes. The lumens must be carefully brushed and irrigated. Failure to meet all processing requirements can result in the patient’s
loss of sight. The instruments are very delicate and do not tolerate rough handling or being dropped.

**OBJECTIVE 3: DISCUSS THE STERILIZATION PROCESS FOR EYE INSTRUMENTATION**

Eye instruments should be sterilized using the methods and conditions recommended in the specific instrument manufacturer’s written IFU. Any discrepancies between the sterilizer manufacturer’s written IFU, the facility’s sterilization processing equipment, and the instrument manufacturer’s written IFU should be resolved by contacting the instrument’s manufacturer. The sterilization process should be effective, monitored and documented.

Immediate-Use Steam Sterilization (IUSS), formerly known as flash sterilization, should not be used as a substitute for an adequate quantity of instruments. IUSS may create an additional risk of infection to patients because of time pressures placed on personnel to rush the cleaning and sterilization processes which, in turn, could lead to skipping necessary steps. If IUSS is necessary due to an emergency situation, the instruments must still be subjected to the same decontamination process as those that receive terminal sterilization. Also, the instrument manufacturer’s recommended IUSS cycles must be carefully followed when performing IUSS.

**IN CONCLUSION**

Processing ophthalmic surgical instruments is a challenge due to their small and delicate composition. CIS technicians must commit the necessary time and effort required for thorough and efficient processing to ensure positive patient outcomes. The instrument manufacturer’s IFU must be carefully and consistently followed to avoid patient incidences of TASS. Careful handling and inspection will help preserve these instruments for many years.

**RESOURCES**


IAHCSMM acknowledges the assistance of the following two CS professionals who reviewed this lesson plan:

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