LEARNING OBJECTIVES
1. Explain the need for a surgical instrument repair and refurbishment program
2. Outline differences between surgical instrument repair and refurbishing, and the advantages of a surgical instrument preventive maintenance program
3. Identify the types of services available from an instrument repair company
4. Review how to determine if instruments are in need of repair
5. Describe how to select a surgical instrument repair vendor

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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OBJECTIVE 1: EXPLAIN THE NEED FOR A SURGICAL INSTRUMENT REPAIR AND REFURBISHMENT PROGRAM
Surgeons require instruments that perform correctly every time they are used. Normal wear and tear affects surgical instruments and, over time, they will no longer perform as required. For example, scissors will become dull and not cut tissue easily, thereby tearing or damaging tissue, and instrument jaws can become misaligned and create grasping or other performance problems. Pitting or numerous other changes will occur as instruments are used, cleaned and sterilized. It is not enough to repair an instrument when it breaks; instead, safety procedures require that surgical instruments be maintained with a repair and refurbishment program.

Proactive instrument maintenance involves several steps. Certified Instrument Specialist (CIS) technicians must ensure they properly clean, decontaminate, inspect, assemble, package and sterilize instruments according to the manufacturer’s instructions. Surgical team members must then confirm the surgeon has the appropriate instruments for the procedure being performed. Using the wrong size of a specific instrument can cause it to become misaligned and create problems with future performance. Using the wrong instrument for a procedure can also cause instrument functioning problems. Unfortunately, these situations can occur and, when they do, instrument concerns must be quickly recognized, so they can be repaired on a timely basis and returned to use.

In addition to identifying instrument problems and repairing them, it is also necessary to implement an ongoing preventive maintenance program. Instruments should be inspected to ensure they are performing properly. Scissors sharpness can be tested, instrument jaws can be inspected to ensure they are properly aligned and instrument surfaces can be checked for discoloration, pitting or corrosion. Instruments with problems should be sent for repair before they are returned to operating suites. Also, routine maintenance activities can help prevent these problems from occurring.

OBJECTIVE 2: OUTLINE DIFFERENCES BETWEEN SURGICAL INSTRUMENT REPAIR AND REFURBISHING, AND THE ADVANTAGES OF A SURGICAL INSTRUMENT PREVENTIVE MAINTENANCE PROGRAM
Some healthcare facilities only utilize instrument repair programs, while other facilities have instrument refurbishment services.
OBJECTIVE 3: IDENTIFY THE TYPES OF SERVICES AVAILABLE FROM AN INSTRUMENT REPAIR COMPANY

Instrument repair companies offer a wide variety of services. Most companies offer onsite assistance using a repair van driven to the healthcare facility. Surgical instruments are then taken to the van where a variety of services can be performed. Immediately following repair, the instruments are returned to the facility, so they can be processed and returned to service. This, in turn, ensures minimal downtime for the instrumentation.

Examples of services provided include:
- Repair, sharpening, realignment and refurbishment of hand-held surgical instruments
- Reinsulation of electrosurgical instruments
- Insert replacement for needle holders and scissors
- Diamond dusting (the process of coating instruments to protect their surfaces, make them stronger and extend their lives)
- Sterilization container repair
- Sterilizer cleaning
- Case cart repairs

In addition to onsite repair services, more extensive repairs can be performed at national service centers. These repairs include those rendered for:

**Endoscopy equipment**
- Rigid endoscopes
- Flexible endoscopes
- Video equipment
- Flexible biopsy forceps
- Medical fiber optic cable repair
- Surgical headlight repair
- Endoscopic retractor repairs
- Light carrier repair

**Power equipment**
- Pneumatic and electric battery
- Phacoemulsification ultrasonic hand pieces (these instruments help dissolve and break up cataract lenses, and suction them out of eyes)

In addition to repairing these complex instruments, many repair companies offer the use of loaner equipment while the healthcare facility’s equipment is out for repair. Frequently, loaner equipment is available at no additional charge.

OBJECTIVE 4: REVIEW HOW TO DETERMINE IF INSTRUMENTS NEED REPAIR

Some instrument problems are common among surgical instruments, and others are unique to specific types of instruments. Corrosion, pitting, cracks and stains are common problems with most instruments, and much can be done to limit the extent of these problems such as:
- Ensuring blood does not dry on instruments, damaging the instrument’s finish
- Using the correct instrument size, so the box lock does not crack
- Ensuring instrument finishes are periodically refurbished to prevent surface damage

Once identified, these common problems must be addressed. Visual inspection of instruments helps identify these types of problems because many of these concerns can be seen with the naked eye. Generally, however, it is recommended that instruments be inspected under magnification; hairline cracks, for example, are difficult to see without magnification. Some instruments require the use of special inspection tools to determine if problems are present. Instruments with lumens, especially those that are long and narrow, cannot be easily inspected for debris, discoloration, corrosion or cracks within their lumens. Special inspection scopes are available for inspecting these instruments.

Instrument should also be inspected to ensure they function properly. Any instrument that has movable parts should be manipulated to ensure the parts move freely without hesitation or obstruction. Jaws should align and not overlap. All screws and springs should be present, and they should not be loose or misaligned. Instruments should not be dented, nicked or have a burr or broken tip. Ratchets of ring-handled instruments should catch and hold.

In addition to these general problems, others are specific to particular types of instruments. Scissors, kerrison rongeurs, bone cutters and osteotomes should be checked for sharpness. Blades should not be nicked, dented or corroded. Needle
holder surfaces will wear and no longer tightly hold a needle. These can be inspected under a microscope to ensure a needle can be held tightly.

If problems are found during instrument inspection, the affected instrument should be removed from the tray and replaced. The damaged instrument should then be placed in a bin for repair or refurbishing, and they should not be reused until they have been repaired.

**OBJECTIVE 5: DESCRIBE HOW TO SELECT A SURGICAL INSTRUMENT REPAIR VENDOR**

The key to maintaining surgical instruments throughout their useful life relates to the quality of their refurbishing and repairs, as needed. This, in turn, requires the selection of a high quality refurbishing and repair company. Surgical instrument repair is as much an art as it is a science; therefore, repair technicians must know not only how to repair an instrument, but also understand how the instrument is used.

The best repair technicians understand that a surgical instrument is an extension of the surgeon’s hands, and that the device must function as quickly and intuitively as the surgeon’s hand. This requires an artistic sense, as well as the ability to perform the technical functions required for instrument repair. Similar to CIS technicians, instrument repair technicians must be carefully and comprehensively trained.

Consider the repair company itself. The best companies have a large inventory of available parts of medical-grade quality equivalent to those used by the original equipment manufacturer (OEM). Generally, parts should be new and not used or remanufactured. If less than new parts are used, they should be identified before the repair is made. Then, after repairs are made, the repairs should be warranted to protect the facility if a repair fails within a specified time after it was returned to service. The facility should not be charged if the instrument needs subsequent repair, or it should not pay for the original repair if no further repair is possible.

In addition to these basic services, instrument repair companies might also provide some value-added services, including inservice training. Many instrument repairs are needed because of misuse, and training in their proper care, handling and processing could reduce the need for these repairs.

Availability of loaner equipment is also important. A large inventory of various types of loaner equipment should be available by the repair vendor to ensure that the facility will not be without necessary equipment, when needed. Cost of obtaining loaner equipment is also important; some companies provide loaners free of charge, while others charge a fee.

It is also helpful if an instrument repair company provides repairs for obsolete equipment. New equipment models are constantly being developed and facilities cannot purchase new equipment each time a new model is introduced. If the repair company can still maintain and repair the older-model equipment, its useful life is extended.

**IN CONCLUSION**

Instrument repair/refurbishment is an important requirement for properly maintaining a facility’s surgical instrumentation. Instruments are valuable assets that require maintenance to ensure that the facility will obtain the maximum useful life from its instrumentation investments. This is better ensured when the instruments are included in a comprehensive instrument refurbishment and preventive maintenance program. The best results are realized when a high quality instrument repair company is used. CIS technicians must be trained to inspect instruments so those with problems are not passed on to the surgical team. Each of these and related tactics help to minimize instrument failure that can impact facility staff and patients.

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OBJECTIVE 1
1. Normal wear and tear on a surgical scissor will cause the scissor to become:
   a. Dull
   b. Discolored
   c. Corroded
   d. Pitted
2. Poor maintenance of surgical instruments can cause the instrument to:
   a. Become stained
   b. Harm a patient or surgical team member
   c. Become difficult to clean
   d. Become difficult to identify
3. Proactive preventive maintenance on surgical instruments involves:
   a. Having the surgical team identify instrument problems
   b. Replacing instruments as they age
   c. Sending all instruments for refurbishment at least once a year
   d. Inspecting instruments for problems

OBJECTIVE 2
4. Instrument repair programs are viewed as being proactive for maintaining instrument quality.
   a. True
   b. False
5. In an instrument refurbishment program, a proactive inspection is performed by:
   a. The surgeon
   b. The lead Operating Room scrub technician
   c. The instrument repair technician
   d. The Operating Room circulating nurse

OBJECTIVE 3
6. Instrument preventive maintenance programs can be set up to be performed at specified timeframes.
   a. True
   b. False
7. Onsite instrument repair services include all of the following, EXCEPT:
   a. Sharpening of scissors
   b. Replacement of inserts in needle holders
   c. Reinsulation of electrosurgical instruments
   d. Repair of fiber optic cables
8. Offsite repair services may include placement of loaner instruments to prevent downtime.
   a. True
   b. False

OBJECTIVE 4
9. Visual inspection of instruments helps to identify:
   a. Corrosion, pitting, cracks and stains
   b. Blockage in the middle of narrow lumens
   c. Dullness in scissors
   d. Poor holding of ratchets
10. Which instruments should be checked for sharpness?
    a. Hemostats
    b. Needle holders
    c. Kerrison rongeurs
    d. Retractors

OBJECTIVE 5
11. Instruments with very long and narrow lumens can be inspected by using a(n):
    a. Inspection scope
    b. Lighted magnifying glass
    c. Caliper
    d. Color chart
12. Surgical instrument repair is as much art as it is science.
    a. True
    b. False
13. A good instrument repair technician understands that the surgical instrument must:
    a. Be protected with a properly applied iron oxide coating
    b. Perform as an extension of the surgeon’s hand
    c. Be made of high quality stainless steel
    d. Have a useful life of at least 10 years
14. Which is a value-added free service that an instrument repair company might provide?
    a. Instrument inservice education
    b. Replacement of non repairable instruments with instruments from the original equipment manufacturer
    c. Management of the Central Service department
    d. None of the above
15. The best instrument technicians are usually self trained.
    a. True
    b. False

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