LEARNING OBJECTIVES

1. Discuss the traditional different types of instrument identification methods
2. Explain how to apply instrument identification tape
3. Introduce new technology for instrument identification
4. Discuss the benefits of new instrument identification technology

OBJECTIVE 1: DISCUSS THE DIFFERENT TYPES OF TRADITIONAL INSTRUMENT IDENTIFICATION METHODS

Only marking methods designed and tested to withstand multiple cleaning and sterilization cycles should be used for instrument identification. Items such as magic markers, finger nail polish, and paint should not be used because the marking material can flake off of or leave toxic residues on instruments.

Instrument identification information should be placed in an area that will not interfere with the device’s working mechanism.

After an instrument identification method has been used, the resulting tagging marks should be inspected after each use for chipping, peeling (such as removing skin from an apple), flaking (when the marking tape comes off in pieces), and tag removal problems. This inspection is important to help prevent tape particles from infecting a surgical wound. Also, microorganisms can get under the marking and be shielded from the cleaning and sterilization methods being used.
There are several traditional instrument identification systems:

- **Electro-chemical etching.** This system can be used to keep all instruments in a set together. A trained CS technician can perform acid-based etching, although an instrument repair vendor typically provides this service. Letters, numbers or shapes can be placed on stainless steel instruments using an acid-base etching kit with a stencil and solution (electrolyte fluid). Using the solution, an instrument etcher passes a low-voltage electrical current through gaps in the stencil. The imprint on the stencil is transferred onto the instrument in approximately 2-3 seconds by pressing the stencil between the marking head and the metal instrument. *Note: This method is not permanent, and the marking material can be buffed off during the instrument repair process.*

- **Heat-fused nylon (dipping).** This identification method is also used by some facilities to keep items in instrument sets together. Heat-fused nylon is a powder-coating process that leaves a thin layer of color remaining on the instrument. This process can be performed by an instrument repair facility or manufacturer. While the instrument markings that result can last many years, over time this coating can begin to chip. When this occurs, the affected instruments must be removed from service for refurbishing and remarking prior to reuse.

- **Engraving.** This marking process is not recommended because it removes the protective surface of the instrument and causes destruction of the instrument. Engraving also weakens the box lock area of instruments and damages their finishing layer. This, in turn, creates a place for debris and bacteria to hide.

**OBJECTIVE 2: EXPLAIN HOW TO APPLY INSTRUMENT IDENTIFICATION TAPE**

The use of instrument tape is another method commonly used for instrument identification. Its primary purpose is typically to keep all instruments in a set together by using the identical tape on each instrument. Then, for example, if an instrument marked with a specific color or design of tape is found in a miscellaneous bin, the tape identifies the set to which it should be returned. A book or poster showing the instrument tape matched with each applicable instrument set is used in many CS departments.

Instrument tape comes in a variety of colors and designs. It can be placed on the instrument at the hospital by a CS technician that has been trained in instrument tape application. Some facilities use more than one tape to make multi-colored stripes or shapes to distinguish instrumentation.

Instrument tape is available on pre-cut sheets or in rolls that are then cut for application. The tape must be manufactured specifically for instrument identification to withstand numerous wash and sterilization cycles. It must also be able to adhere to the instrument and maintain construction quality during surgical procedures.

Instrument taping requires specific skills. For example, instrument tape is manufactured to adhere to metal instrumentation, not to itself. *Note: This is a reason that instrument tape is only applied one to one-and-a-half times around the instrument. If the tape is applied incorrectly, it can loosen and provide a hiding place for debris.*

To apply instrument tape:

- **Step 1.** Select the area on the instrument for tape application. The selection site should be a flat surface, such as an instrument’s shank, rather than the rounded area of an instrument, such as ring handles.
- **Step 2.** Wash hands and clean fingers with 70% isopropyl alcohol to remove oils, grease and dirt.
- **Step 3.** Wipe the area on the instrument where the tape will be applied with 70% isopropyl alcohol. All lubricants, debris and moisture must be removed.
- **Step 4.** Cut roll tape to fit the instrument. *Note: Cut the tape on an angle to allow its edges to lie flat. Pre-cut tape is removed from the sheet.*
- **Step 5.** Wrap the tape around the instrument one to one-and-a-half times, while applying it with a firm and pulling tension. Be sure to overlap the first tape layer at least once, but not more than twice. Placing too much tape on an instrument can cause a layering problem where the tape can eventually come undone and create a hiding place for debris and bacteria.
- **Step 6.** After tape application, the instrument should be autoclaved, so the heat can help bond the tape to the instrument.

After tape has been applied to an instrument, its routine inspection must be an important aspect of instrument processing activities (remember, taping is not a permanent marking method). It is important to ensure the tape lies flat against the instrument’s surface each time it is inspected. The inspection must confirm the tape is not chipped, cracked, flaked, lifted from the instrument, or becoming unwound. If the tape is not intact and/or does not completely adhere to the instrument, it and all tape residue must be removed. Breaches in instrument tape can trap soil and microorganisms. In addition, chips of tape can break off during a surgical procedure and fall into a surgical site.
OBJECTIVE 3: INTRODUCE NEW INSTRUMENT IDENTIFICATION TECHNOLOGY

Instrument identification technology has evolved, and barcode matrixes are now placed directly onto instruments or package labels. Barcode matrixes are laser-etched, two-dimensional markings, and they are used in barcode methods to track individual surgical instruments. Once applied to an instrument, all barcodes can look similar; therefore, unlike identification tape, there is no visible way to distinguish between instruments.

A barcode matrix is designed to be used with instrument tracking software applications. There are two different types:

- **Barcode matrix label.** A barcode matrix label is applied to an instrument in the same manner as instrument tape. CS personnel should only use matrixes that (a) have been tested for sterilization and (b) can be used on stainless steel or plastic surgical instruments.¹

- **Permanent marking.** A barcode matrix is permanently placed on the passivation layer of an instrument using an electrochemical marking system. *Note: The passivation layer is applied during the instrument manufacturing process. It yields a corrosion-resistant finish by forming a thin, transparent oxide film.*

Permanent marking methods are typically performed by instrument vendors.²

Once applied to an instrument, the unique barcode contains information specific to that instrument that has been entered into the facility's instrument tracking program. While instrument tracking information differs between specific systems, common information typically includes instrument name, method of sterilization, and storage location. After data is entered into the tracking system, the barcode matrix can be scanned using a specific barcode scanner. Once scanned, the tracking screen provides any special information, including whether the instrument should be sterilized disassembled, how many pieces should be present, and any special sterilization positioning requirements.

A clearly-printed label and count sheet are also printed. The label is affixed to the package and provides the instrument’s name, date, sterilization method, storage location, and a barcode of the unique instrument identifier.

The system also indicates the number of times the instrument has been used, and the number of times it can be used before scheduled repair/maintenance.

Then, the instrument tracking system can record the sterilization information that links the instrument to the sterilization load, including the date, time, sterilizer, and quality monitors. After sterilization, the instrument can be scanned again when it is sent to another location or patient, or when it is placed into storage. Sterilization and patient use history can be accessed at a later time, if necessary.

OBJECTIVE 4: DISCUSS THE BENEFITS OF BARCODE TECHNOLOGY

A contemporary barcode instrument tracking system provides many benefits, including:

- **Standardization.** When all necessary information is available, the guesswork is removed from instrument preparation. The data can be of significant assistance in the training of recently-employed CS technicians who are learning about instrumentation because the device’s correct name and other pertinent information is provided each time it is scanned.

- **Clearly-labeled packages.** Not all single instruments are placed in see-through peel packs. For example, some larger instruments, such as Conner O’Sullivan retractors, weighted vaginal speculums, and chest retractors, are packaged in...
flat wrappers. Printed labels eliminate guesswork that can be created when labels are handwritten. They also promote the use of a consistent name for each instrument by CS personnel, users, and in the sterilization record-keeping system.

• **Instrument tracking.** Contemporary tracking systems provide traceability throughout the entire healthcare facility. Instruments are scanned with each transfer, so their current locations are always known.

• **Patient traceability.** Some instrument tracking programs are able to incorporate the use of barcode matrixes into their systems to enable instruments to be tracked to specific patients.

• **Inventory information.** Many instrument tracking systems include instrument inventory management opportunities. The purchase and maintenance histories for specific instruments are tracked, and maintenance alerts are activated based on actual use. Monitoring the actual use can identify the need for additional instrumentation or indicate infrequently-used instruments.

• **Storage identification.** The availability of an item’s storage location on the label reduces the chance of misplaced instruments. For example, a scissor may be used in the Cardiology service that appears to be the same as one used in the Neurology service. When both scissors are labeled with their specific service or storage location, the time needed to search for a missing instrument is significantly reduced.

• **Record-keeping.** Instrument tracking systems can document all of the processes required for the facility’s instrument and sterilization records. These records can be stored in the healthcare data system, which eases the task of accessing records and reduces the storage of paper records.

**IN CONCLUSION**

The instrument identification process has traditionally been used to maintain the contents of instrument sets and better ensure that instruments remain together. New methods of instrument identification enable each instrument to have its own unique identifier. From there, each instrument can be tracked and recorded throughout all healthcare processes and on to each patient.

**REFERENCES**

1. Additional information is available at www.keysurgical.com/products/instrument-tracking.

2. Additional information is available at www.censis.net.

**ADDITIONAL READING**


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

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