SURGEONS HAVE LONG BEEN CONFRONTED WITH CHALLENGES AS they consider the best method of closing incisions. In early surgical history, suture selection included very few options; however, modern suture selection decisions relate to several factors, some of which are physician-driven and others based on specific patient needs. Central Service (CS) professionals must be familiar with the types of sutures and needles used in their facility. With this familiarity, they can then consistently provide requested items in their ongoing efforts to provide excellent customer service to the patients, physicians and surgical team members.

Suture materials are available in numerous sizes, packaging and delivery styles. For example, common “ties” are suture material provided without a needle attached or without a needle included in the package that are used to ligate (tie off) smaller blood vessels not closed by electrosurgical cautery (burning). Ties may be packaged separately in lengths of 18” and 30” to accommodate the working depth of the procedure being performed. Note: Typically, surgeons prefer shorter sutures unless longer ones are required.

Ties are also available in several types of material preloaded onto a plastic reel (dispenser), which provides a continuous length of suture to prevent the need to repeatedly hand off sutures. Alternately, ties of a required suture material may be requested with a specific and separate “free needle” (one with an eye through which the chosen suture material is threaded). The surgeon can then meet patient-specific needs when similar “swedged-on” sutures (those in which the suture is molded onto the needle as a continuous unit) are unavailable.

SWEDGED-ON SUTURES
Most sutures are available in multiple sizes and with a wide variety of needle types. For example, swedged-on needles can be “pop-off,” which means the slightest tug between the suture and the needle causes the needle to be immediately and permanently detached.
from the suture material. Pop-off sutures allow placement of an interrupted suture stitch, which secures tissue approximation by knotting or tying off each individual suture. Sutures with pop-off needles are packaged with eight individual sutures and needles.

A second type of swedged-on needle provides a permanent attachment between the suture and needle, and allows the surgeon to place a continuous running or locking suture line. The needle is cut from the suture prior to securing the suture knot. This swedged-on needle is available in packages of one, three or five individual sutures and needles. Note: The same suture material swedged onto the same type of needle may be provided in packages of different suture lengths.

The majority of sutures, including those previously outlined in this lesson, have a needle swedged onto only one end; these are sometimes referred to as single-arm sutures. By contrast, double-arm sutures have a needle swedged onto each end of the suture material; however, any suture request is presumed to be single-arm, unless a specific request is made for a double-arm suture.

The variety of sutures available can seem almost endless and confuse those who are new to the surgical environment; however, every variation has a unique reorder/catalog number prominently displayed on each suture package and storage box. CS professionals should encourage the use of the specific suture number on all surgeon preference cards (electronic or manual) and with each individual suture request from the sterile core. Unfortunately, in many facilities, this is not the preferred method of suture requisition for surgeons or surgical staff. Gentle guidance from CS staff about the benefits of including the identification number will help best ensure superior service.

MORE ABOUT SUTURES

Suture is produced from a wide variety of animal-based and synthetic materials. The simplest categories are “absorbable” and “non-absorbable.” Absorbable sutures will eventually dissolve, absorb into the tissue and become non-identifiable. The speed at which this occurs is determined by the specific material, tissue condition, over-all patient health and size of the suture utilized. Non-absorbable sutures are permanent fixtures in the body and, when properly tied or secured, will remain intact indefinitely.

Sutures can be made of monofilament (single strand) and braided (multiple strand) materials. Those made from chromic gut, plain gut and stainless steel are monofilament. Nylon can be purchased as either a monofilament or braided suture. Silk and polymers (tiny molecules in long repeating chains) are used to make polyglycolic acid (PGA) sutures from multiple strands of material braided to form a single strand. Surgeons select the type of sutures they wish to use based on tissue condition, potential for wound infection and the patient’s overall health.

Suture sizing is based on a scale where zero (0) is the common indicator. A size zero suture is the same thickness, regardless of the type of material from which it was made. Note: The zero distinction does not relate to the material’s tensile strength (the stress it can bear without tearing apart). All other suture sizes...
Suture materials thicker or heavier than zero are indicated by a number larger than zero; the larger the number, the thicker the suture material. When suture material is smaller than zero, the size is indicated by a number, minus zero. Sutures are available from a size 10-0 (smallest size) to a 5 (largest size).

When discussing/verbalizing suture sizes, they are referred to as number 1, 2, 3, 4 or 5 and 0 (zero or “oh”), 2-(“oh”) and so on. Note: One will not hear anyone ask for a 1-0 (“oh”) suture.

Here is a recap of suture sizes: Suture sizes 10-0, 9-0, and 8-0 require a microscope and the use of microscopic-style needle holders. Suture sizes 7-0, 6-0, and 5-0 usually require the surgeon to wear magnifying glasses and use microscopic needle holders. Sizes 4-0 and 3-0 do not require magnification to effectively place the suture, but a smaller or lighter weight needle holder is required. Sizes 2-0 through 5 sutures can be placed with standard Mayo-Hegar needle holders.

Storage and arrangement of suture material will depend greatly on the facility and the surgical service lines being offered. Staff may find all general or commonly-used suture of a single material and/or type grouped together and arranged by size (such as 1-0, 2-0, 3-0, etc.). Manufacturers utilize a color code on the box and package for easy identification. Specialty sutures may be stored separately (e.g., Ophthalmic and cardiovascular sutures could be on separate racks or carriers). It is critical to know where and how sutures are stored, so optimal service can be provided to the surgical team.

**SUTURE NEEDLES**

CS technicians recognize the need to know basic information about needle types and sizes, so they can select the requested suture. As previously stated in this lesson, each variation of suture material, suture size, needle type and needle size has a unique reorder/catalog number. Needle size and type are noted on the dispensing box and on individual suture packets.

Needles can be tapered, cutting, trocar or blunt. Some needles are straight and generally do not require use of a needle holder. The amount of desired needle curvature relates to the location and type of tissue that the needle is designed to approximate (close). Tapered needles are curved and round bodied and are of two basic types. One type is a small delicate needle used to suture bowel tissue and ligate larger blood vessels or other thin tissue; they are often referred to as gastrointestinal (GI) needles. They may be used, for example, if a blood vessel is cut during surgery and the surgeon must place a suture ligature to control bleeding. These GI needles are available in different sizes of the same shape, style and thickness (CS personnel may receive a STAT request for a “3-0 silk GI to OR #2”). This requisition would be for a single swedged-on, 3-0 silk suture on a delicate tapered needle. Alternate specialty needles vary in size, thickness and curvature, depending upon the type of procedure for which they will be used (e.g., Ophthalmology, plastic and cardiovascular).

The second type of tapered needle is heavier and used when the tissue being approximated is thicker or denser. It is often referred to as a general closure (GC) or Mayo needle. GC needles also come in graduated sizes, with needle size designations differing by brand of needle. These needles they are available attached to a variety of suture materials. Figure 2 shows examples of GI and GC needles.

Cutting needles can be straight or curved, and they have a three-point diamond-shaped tip that blends into a...
round body. Straight cutting needles, also referred to as Keith needles, are generally used for skin closure and do not require a needle holder. Cutting needles are available in numerous sizes, curvatures and direction of cut. They are used in virtually every surgical specialty, with each needle having its own unique needs that correspond to the tissue being sutured.

Trocar needles are very aggressive needles with a broader cutting edge. Tissue that is very fibrous and dense, including strong connective tissues, such as tendons and ligaments, might require the use of a trocar needle. These needles may be purchased in a variety of sizes and curvatures.

Blunt needles are large and curved and used to approximate very fragile tissue. As the name implies, the tip is less pointed and more rounded to prevent additional tissue damage. These needles are primarily used to suture the liver, pancreas and kidneys.

IN CONCLUSION
This lesson explored numerous details about suture materials that are of critical importance to Central Service technicians. Surgeons requesting them have very specific needs and careful attention to their requirements is necessary to ensure that the right sutures and needles are available for surgical procedures. Quality service will best be assured when CS professionals know suture basics and then consistently apply this knowledge as suture materials are stored and issued for use in surgical suites.

AUTHOR NOTE: Surgical technology has provided several suture replacements. For example, internal tissue and skin can be approximated using staples made of surgical stainless steel or titanium, and clear-adhesives and fluid-proof sealants are also available. These alternatives greatly enhance tissue healing by reducing tissue reaction and the overall surgical and anesthesia time required for the procedure. Better patient outcomes are a positive result. These products will be more fully explored in a separate lesson.

RESOURCE

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WANT TO BE AN AUTHOR?
IAHCSMM is seeking volunteers to write or contribute information for our CRCST Self-Study Lessons. Doing so is a great way to contribute to your own professional development, to your Association, and to your Central Service department peers. IAHCSMM will provide guidelines and help you with the lesson to ensure it will be an enjoyable process. For more information, please contact Julie Williamson (julie@iahcsmm.org).
1. The minimum length of suture material provided without a needle attached is:
   a. 12 inches
   b. 14 inches
   c. 18 inches
   d. 30 inches

2. “Free needles” are those that:
   a. Are used with “swedged-on” sutures
   b. Contain an eye through which suture material is threaded
   c. Are separately packaged and provided in all instrument sets
   d. None of the above

3. Sutures with “pop-off” needles are packaged with _______ individual sutures and needles.
   a. Two
   b. Four
   c. Six
   d. Eight

4. Suture material that is “swedged-on” to the same type of needle _______ provided in packages of different suture lengths.
   a. Is
   b. Is not

5. Unless a specific request for a “double-arm” suture is made, any suture request is presumed to be for a _______ suture.
   a. Curved arm
   b. Single-arm
   c. Swedged-on
   d. None of the above

6. The speed at which absorbable sutures dissolve is determined by:
   a. The specific suture material
   b. Tissue condition
   c. Size of suture used
   d. A and B above
   e. All the above

7. Which of the following sutures are monofilament?
   a. Chromatic gut
   b. Silk
   c. Polymer
   d. A and B above
   e. All the above

8. A size zero suture _______ the same thickness, regardless of the type of material from which it is made.
   a. Is
   b. Is not

9. Which of the following sutures is the smallest size?
   a. 7-0
   b. 2-0
   c. 0
   d. 5

10. Which sizes of sutures can be placed with standard Mayo-Hegar needle holders?
    a. Size 4-0 and 3-0
    b. Size 2-0 through 5
    c. Size 7-0 and 6-0
    d. Size 9-0 and 8-0

11. Sutures of all sizes require the use of needle holders.
    a. True
    b. False

12. Which of the following are tapered needles?
    a. Gastrointestinal needles
    b. General closure needles
    c. Cutting needles
    d. A and B above
    e. All the above

13. What type of tissue generally requires use of a trocar needle for closure?
    a. Fragile tissue
    b. Liver and pancreas tissue
    c. Fibrous and dense tissue
    d. Almost all types of plastic surgeries

14. A general closure needle is often called a:
    a. Gastrointestinal needle
    b. Trocar needle
    c. Blunt needle
    d. Mayo needle

15. Blunt needles are used to approximate:
    a. Dense tissue
    b. Fibrous tissue
    c. Very fragile tissue
    d. All the above, depending upon the surgical procedure