EMBALMING
HISTORY, THEORY, AND PRACTICE

Fifth Edition

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Figure 4-17. Pressure paths 3 and 4.

Figure 4-18. Centrifugal embalming machine. These machines are available with or without pulsation.

to the arterial tube outlet indicated by path 4. When pressure, as regulated by the rate-of-flow control valve, is drastically reduced so that only a small trickle of fluid is delivered, then high pressures can readily be registered on the pressure gauge. This does not mean, as can be readily realized, that the fluid is leaving the arterial tube under that much pressure!

In other words, with liquid flow paths 3 and 4 cut off by reducing the rate of flow and cutting off the bypass of fluid beyond the pressure control valve (causing high pressures to be registered), fluid can then leave the pump in large quantities only through path 1, which is the bypass back to the tank. It should be remembered that regardless of the amount of pressure being used or how fast the rate of flow might be, the pump always operates at the same speed and its output is always the same. With this knowledge in mind, safety features in the nature of the bypass are included in pressure machines. The pressure reading on the gauge merely indicates the amount of resistance being offered to the flow of the liquid within the confines of the machine. Continual use of “high” pressure places a heavy load on the motor and pump and, most often, this is not necessary (Fig. 4-18).

▷ INSTRUMENTATION

An embalming chemical supply catalog lists many instruments, most of which come in a variety of sizes and modifications. Actually, very few instruments are needed in the preparation of the unautopsied or autopsied body. Most instruments have several uses and this helps to limit the number needed. Unlike a surgical procedure,
embalming is not performed under sterile conditions, so instruments can be reused during the embalming process. Most instruments are constructed of steel and plated with nickel or chrome for protection against rust or chemical agents. They are chemically treated to be heat resistant and durable.

**General Instruments**

**Aneurysm Needle.** A blunt instrument (Fig. 4-19), the aneurysm needle, is used for tissue dissection for determining the location and elevation of arteries and veins. The aneurysm needle has an "eye" in the hook portion of the instrument, which could be used for passing ligatures around a vessel. An **aneurysm hook** is similar but has a sharp pointed tip. Most embalmers prefer to work with the blunt instrument.

**Bistoury Knife.** The bistoury knife is a curved cutting instrument that cuts from the inside outward (Fig. 4-20). Some embalmers prefer this type of instrument for opening arteries and veins. It can also be used for the excision of tissues.

**Hemostat (Locking Forceps).** A wide variety of hemostats are available. The hemostat can be used to clamp leaking vessels. A modification is the **arterial hemostat**, which is used to hold the arterial tube in an artery. The ends of hemostats may be curved or straight, serrated or smooth, or plain or rat-toothed. **Dressing forceps** are very long hemostats. They can be used for packing orifices or handling contaminated bandage dressings (Figs. 4-21 to 4-23).

**Scalpel.** The scalpel is a sharp cutting instrument used for making incisions (Fig. 4-24). It can be purchased with a permanent blade, or the handles can be purchased and disposable blades used. OSHA regulations requires a **sharps container** for the disposition of scalpel and razor blades. These puncture proof containers come in a variety of sizes.

**Scissors.** Scissors are used for cutting. Like the bistoury knife and scalpel, scissors can also be used to open arteries and veins (Fig. 4-25). There is an **arterial scissors** (Fig. 4-25D) manufactured for opening vessels. Scissors vary in length, and their tips may be straight or curved, or pointed or blunt. The blunt side should be used against the skin surface of the body. **Bandage scissors** (Fig. 4-25E) have a very large blunt end to help protect the skin from being cut.

**Separator.** The separator is used to keep vessels elevated above the incision. This instrument can be made of hard rubber, bone, or metal. Often, the handle of an aneurysm needle is designed to function as a separator (Fig. 4-26).

**Suture Needles.** A variety of suture needles are available (Fig. 4-27). The large **postmortem needles** (Fig. 4-27A,B) are used to close autopsy incisions as well as incisions made to raise vessels for injection. These needles are half or double curved. The three-eighth-inch **circle needle** is used for more delicate suturing. The needle eye may be the patented type called a "spring eye" for "self"-threading. The edges can be smooth or cutting (Fig. 4-27C). The half-curved **Loopyupty needle** (Fig. 4-27E) is designed to better grip the instrument.
Figure 4-23. Dressing forceps.

Figure 4-24. Scalpel.

Figure 4-25. A-E. Various types of scissors.

Figure 4-26. Separator.
Figure 4-27. Miscellaneous types of suture needles. A. Postmortem half-curved suture needles. B. Postmortem double-curved suture needles. C. Three-eighths-inch circle needles with “spring eye.” D. Half-curved suture needles. E. Loopuypt needles.
**Spring Forceps.** The spring forceps is an instrument used for grasping and holding tissues. The limbs may be straight, curved, or angular (Fig. 4–28). Angular spring forceps are used as a drainage instrument, generally in the internal jugular vein. The tips of forceps may be serrated, smooth, or rat-toothed. Most embalmers use several types and lengths of spring forceps. This instrument is available in a large variety of lengths.

**Suture Thread.** Suture thread is sold by the twist or cord, three cord being thinner than five or seven cord. Suture thread is available in nylon, cotton, and linen. Some embalmers prefer that it be waxed. Dental floss can also be used for suturing.

**Injection Instruments**

**Arterial Tubes.** There are many types, lengths, and sizes of arterial injection tubes: those small enough for injection of infants and distal arteries, such as the radial and ulnar arteries in the adult, and those large enough for injection of the large carotid arteries. Carotid tubes are short and very large in diameter. The hub of an arterial tube can be a **threaded** type (Fig. 4–29A), to which a stopcock can be attached, or a **slip-type**, to which the delivery hose from the machine can be directly attached. The tube itself can be curved or straight. Luer-Lok (Fig. 4–29C) arterial tubes were developed for high-pressure injection. These tubes attach to a connector on the delivery hose much the same as a hypodermic needle attaches to a syringe.

**Stopcock.** The stopcock is used to attach the delivery hose from the injection device to the arterial tube (Fig. 4–30A). Luer-Lok stopcocks are used for arterial tubes with Luer-Lok attachments (Fig. 4–30B). The stopcock can be used to maintain and stop the flow of fluid into the arterial tube.

**Y Tube.** The Y tube was developed for the embalming of autopsied bodies. It allows the embalmer to embalm both legs or arms or sides of the head at the same time (Fig. 4–31). Double Y tubes have been developed that allow for injection of four body regions at the same time.

**Hypovalve Trocar.** The hypovalve trocar is designed for hypodermic treatments (Fig. 4–32). It is **not** used for aspiration but rather for injection.

**Drainage Instruments**

**Drain Tube.** The drain tube is a metal cylinder with a cleaning rod designed to be inserted into a vein (Fig. 4–33). Drain tubes are always inserted toward the heart. They help keep the vein expanded and can be closed to build circulatory pressure. The stirring rod can be used to fragment large clots. There are many sizes. Jugular drain tubes are generally very large in diameter and short; axillary drain tubes are often slightly curved; infant drain tubes can be used for small vessels such as the femoral and iliac in the infant. A hose can easily be attached to the drainage outlet so the blood drained can easily be controlled or collected and disinfected.

**Angular Spring Forceps.** These angular forceps have a working length of 2½ to 7 inches. They are inserted much like the drain tube into a vein and directed toward the heart. They allow clots to be grasped and pulled from within a vein.
Figure 4-29. A. Curved threaded arterial tubes. B. Straight threaded arterial tubes. C. Luer-Lok.

Figure 4-30. A. Stopcock used to attach the delivery hose from the injection device to the arterial tube. B. Luer-Lok stopcock used for arterial tubes with Luer-Lok attachments.
**Figure 4-31.** A Y tube used for embalming autopsied bodies.

**Figure 4-32.** Hypovalve trocar. Designed for hypodermic treatments. Used for injection, not aspiration.

**Figure 4-33.** Drain tubes can be used to build circulatory pressure.

**Figure 4-34.** Iliac drain tube. This long tube is designed to be inserted into the external iliac vein.

**Figure 4-35.** Groove director. Used to expand a vein to help guide a drain tube or drainage device into the vein.
Figure 4-36. Autopsy aspirator. The many openings guard against clogging during aspiration of either blood or arterial fluid from the cavities of autopsied bodies.

*Iliac Drain Tube.* The iliac drain tube is a long drain tube designed to be inserted into the external iliac vein and the tip is directed into the right atrium of the heart (Fig. 4-34). These tubes may be soft rubber, plastic, or metal.

*Grooved Director.* The grooved director is used to expand a vein to help guide a drain tube or drainage device such as angular spring forceps into a vein for drainage (Fig. 4-35).

**Aspirating Instruments**

*Autopsy Aspirator.* An autopsy aspirator has many openings so as to be "non-clogging." It is used to aspirate blood and arterial fluid from the cavities of autopsied bodies (Fig. 4-36).

*Hydroaspirator.* The hydroaspirator is an aspirating device that creates a vacuum when water is run through the mechanism (Fig. 4-37). Most hydroaspirators are equipped with a vacuum breaker so aspirated material flowing through the device does not enter the water supply should there occur a sudden drop in water pressure.

*Nasal Tube Aspirator.* The nasal tube aspirator attaches to the aspirating hose. It is designed to be inserted into the nostril or throat for limited aspiration of the nasal passage or the throat (Fig. 4-38).

*Trocar.* The trocar is a long hollow needle. The length and the diameter of this instrument are quite variable (Fig. 4-39). The points are threaded so they may be changed when dull. The handle may be threaded or have a slip hub. Infant trocars are short and small in diameter. They may also be used for hypodermic injection treatments. The standard trocar is used to aspirate and inject body cavities.

*Cavity Fluid Injector.* The cavity fluid injector screws onto the cavity fluid bottles. When the device is inverted, cavity fluid flows through the trocar into the body cavities (Fig. 4-40).

*Trocar Button.* A threaded plastic screw used for closing trocar punctures, the trocar button may also be used to close small punctures, surgical drain openings, and intravenous line punctures. They are available in several sizes (Fig. 4-41).

*Trocar Button Applicator.* The trocar button applicator is used to insert the trocar button (Fig. 4-42).

**Feature Setting Devices**

*Eye caps.* Eye caps are plastic disks inserted under the eyelids. They keep the eyelids closed and prevent the eyes from sinking into the orbit (Fig. 4-43).
**Figure 4–38.** Nasal tube aspirator. Attaches to the aspirating hose. Designed for nasal insertion.

**Figure 4–39.** Trocar. A long hollow needle with threaded points that can be changed.

**Figure 4–40.** Cavity fluid injector. Screws onto cavity fluid bottles.

**Figure 4–41.** Trocar button. Threaded plastic screw used for closing trocar punctures.

**Figure 4–42.** Trocar button applicator. Used to insert the trocar button.
Mouth Formers. Mouth formers are plastic or metal devices used to replace the teeth when the natural teeth or dentures are absent (Fig. 4-44).

Needle Injector. A needle injector is used to insert a “barb” into the mandible and maxilla to hold the lower jaw in a closed position. Several types of handles are available which can make the device easier to use. An electric version is also available (Fig. 4-45).

Positioning Devices
Positioning devices enable the embalmer to properly position the head, arms, hands, and feet of the deceased.

Most are constructed of metal, hard rubber, or plastic. Embalmers often employ specially cut blocks of wood to elevate shoulders, arms, and feet. These devices should be properly painted with a water-resistant paint so they can be cleaned after each use.

Head Rests. Headrests can be used to elevate the head and neck. They can be used to support the arms and raise the feet. A head rest can also be placed under the thigh area to help steady bodies with severe spinal curvature or an arthritic condition (Fig. 4-46).
Arm and Hand Rests. Arm and hand rests consist of two curved metal arm holders attached by an adjustable strap. The strap rests across the body while the arms are secured in the arm holder. It is designed to fit bodies of different size and retain both arms and hands in a desirable position.

Shoulder, Body, and Foot Rests. Rests of plastic or metal blocks are used to raise shoulders, feet, or buttocks off the table.

PLASTIC UNDERGARMENTS

Plastic garments can be used to protect clothing from conditions such as ulcerations, gangrene, or burnt tissue. They help to control leakage from the tissue donor body, autopsied body or the condition of edema. Those most frequently used include: pants, coveralls, stockings, sleeves, Capri garments and unionalls. With the exception of sleeves, all of those listed come in a variety of sizes. Powdered deodorants and preservatives may be placed within the garment to control odor and absorb any leakage. The coverall covers the trunk of the body from the upper thigh to the armpit. The unionall covers the entire body except for the hands, neck, and head areas (Fig. 4-47). The Capri garment combines pants and stockings.

Figure 4-46. Headrests.

Figure 4-47. Plastic undergarments.