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## Chapter 2

# BASIC SURGICAL TECHNIQUES

### KEY FIGURES:

Knife blades

Holding the knife

Continuous locking suture

Tying off a vessel

Stick tie

The previous chapter discussed suturing techniques. This chapter describes additional basic surgical skills. All rural healthcare providers should be proficient in these techniques.

### ***Making an Incision***

Many of the procedures explained in subsequent chapters of this book involve making incisions into the skin. Whether it be to remove a suspicious lesion or to create a flap for wound coverage, you must learn how to make an incision safely and efficiently. You will use a knife with a very sharp blade. It is important to know how to use the knife properly to prevent accidental injury to the patient or yourself.

### *Which Blade to Use*

Knife blades come in various sizes (see figure below). There is no orderly scale to follow as with needle sizes. A no. 11 blade comes to a sharp point, whereas a no. 15 blade has a rounded end. A no. 10 blade is twice the size of the no. 15, and a no. 20 blade is bigger than the no. 10. It can be confusing, but most blades come with a picture on the packaging.



Commonly used knife blades. A, no. 11 blade; B, no. 15 blade; C, no. 10 blade.

**Table 1. Deciding Which Blade to Use**

<b>Blade Size</b>	<b>Optimal Setting for Use*</b>
No. 11	Draining an abscess, performing a shave biopsy
No. 15	Performing a biopsy, making incisions < 5 cm, any incisions on the face
Nos. 10, 20	Making incisions longer than 5 cm, debriding wounds

\* This table describes the optimal knife blade to use if you have a choice of sizes. If you do not have the luxury of choice, any blade can be used for almost any situation.

### *Holding the Knife*

For safety, use a blade only when it is attached to a handle. Some disposable knives come with the blade already attached to the handle. When they are not available, you may have to put the blade onto a knife handle yourself. Never touch the blade with your fingers; it is very sharp. Use a clamp or needle holder to grasp the blade, and position it onto the handle.

Hold the handle with your dominant hand, as if you were using a writing instrument. To have the best control over the instrument, hold the handle 3–4 cm away from where the blade meets the handle.



Hold the knife like a writing instrument 3–4 cm behind the point where the blade meets the handle.

### *Using the Knife*

When you are about to make the incision, place the tissue under some tension. Use the index finger and thumb of your nondominant hand to push down on the skin, spread it apart, and make the skin taut. This technique makes the skin easier to incise.

Make the incision with the flat part of the knife, not the very tip. Push the blade down with just enough pressure to cut through the skin. You do not have to go exactly to the proper depth with the first cut. It is better to be too timid than too forceful. If you use too much force to make the incision, your knife may penetrate too deeply into the tissues and accidentally cut an important structure.

### *Which Side to Incise First*

When you have to make two incisions (for example, to remove a suspicious skin lesion), look at their orientation. If they are to be made one above the other (for example, if you are working on the side of the leg), do the bottom skin incision first. If the top incision is made first, blood from the skin edges will drip down and obscure the area below. The presence of the blood makes it more difficult to perform the lower incision.

### ***What to Do about Bleeding from the Skin Edges***

1. **Apply pressure.** Most bleeding from skin edges stops on its own after pressure is applied over the area for a few minutes with a gauze pad.
2. **If you have access to an electrocautery device.** An electrocautery device applies an electrical current that coagulates the tissue and stops bleeding. When this device is used, the patient must be attached to a grounding pad. Wipe away the blood, and touch the bleeding spot with the cautery device. The bleeding usually stops. If you see bleeding from a small blood vessel, grab it with the tips of a metal clamp. Then touch the clamp with the cautery device. Be sure that the clamp is not touching any surrounding tissue. The current will pass through the clamp and burn the surrounding tissue as well.

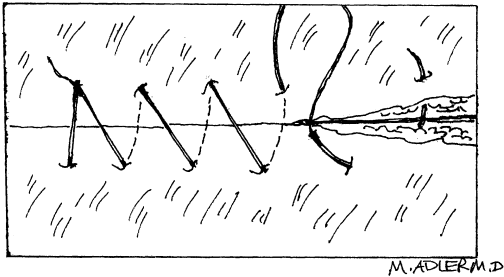
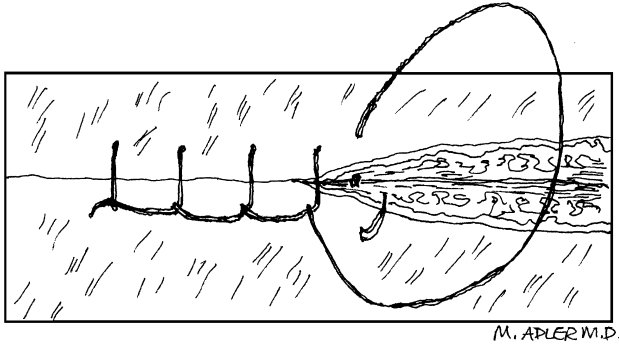
**Caution:** Be sure that your gloves are intact before touching the clamp with the cautery device. If you have a hole in the glove on the hand holding the clamp, you will get zapped when you touch the clamp with the cautery device. You may experience a painful, small burn in your finger or even feel the electric current pass through your body.

3. **Close the wound with a continuous locking suture.** This technique places more tension on the skin edges than the usual continuous closure and often stops the bleeding. A continuous locking suture is often quite useful to control a bleeding scalp wound.

### *How to Place Continuous Locking Sutures*

For the typical continuous suture technique, the thread should always remain *behind* the needle. With the locking technique, the thread lies *in front*

of the needle as it comes out of the tissues. The suture, therefore, comes out of the tissues inside the loop. When the stitch is pulled through the loop, it places the suture material along the outside skin edge, putting pressure on the tissue. The pressure helps to control bleeding.



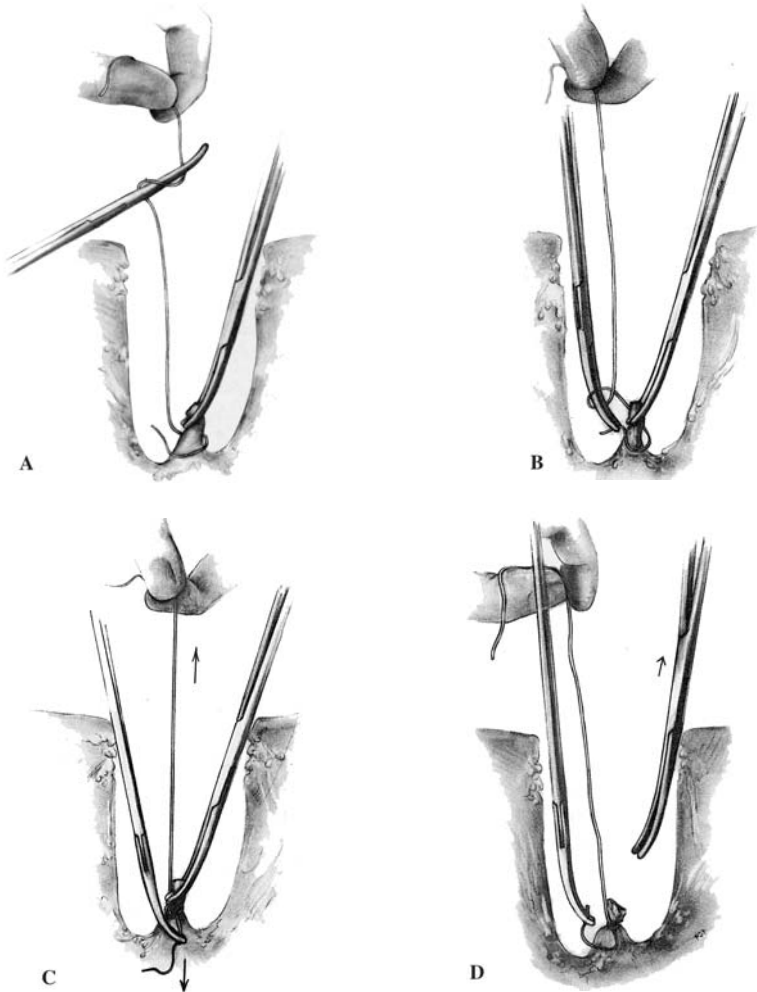
*Top*, Continuous locking suture. *Bottom*, Continuous nonlocking suture. Note the differences in where the suture loop comes out of the skin relative to the needle as well as the appearance of the sutures on the skin.

### ***How to Manage Bleeding from a Blood Vessel***

1. **Apply pressure.** Application of pressure is always a good first choice. It prevents further blood loss and may allow the vessel to clot, thereby stopping the bleeding. Try this technique for at least 5–7 minutes. If it is unsuccessful, the following alternatives should be tried.
2. **If you have access to an electrocautery unit.** If the vessel is a vein or small (1–2 mm) artery, grab it with the tips of a metal clamp and touch the clamp with the cautery device. Be sure that your gloves are intact and that the clamp is applied only to the vessel.
3. **If you do not have access to an electrocautery unit or if the vessel is a larger vein or larger (3–4 mm) artery,** the end of the vessel should be tied off with a suture for secure hemostasis. There are two basic techniques for tying off a vessel (see figures on following pages).

*Regular Tie*

Regular ties are adequate for most veins and small (2–3 mm) arteries. Grasp the end of the vessel with a small clamp, and gently hold the vessel away from the surrounding tissues. Pass a piece of 3-0 or 4-0 silk or Vicryl suture material (the needle is not needed) around the vessel and under the clamp. Tie the suture securely, placing at least 3 or 4 knots.



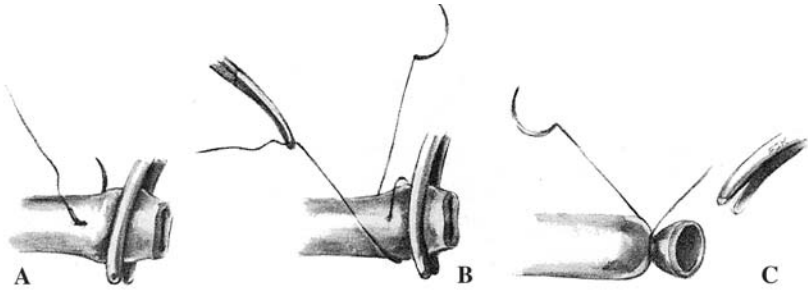
Four major steps (A–D) in tying off a vessel with the regular stitch. (From Edgerton M: *The Art of Surgical Technique*. Baltimore, Williams & Wilkins, 1988, with permission.)

### *Stick Tie*

A stick tie is a more secure technique to control bleeding from a blood vessel. It is especially useful for arteries, because the thicker wall and increased interior pressure of an artery can cause a regular tie to come off of the vessel.

Grasp the end of the artery with a small clamp, and gently lift the vessel. Use a 3-0 or 4-0 silk or Vicryl suture with a needle (a tapered needle is best). Pass the needle through the center of the vessel just under the clamp. Bring both ends of the suture toward yourself (again, under the clamp), and tie the suture securely (just once).

Now take one of the suture ends and pass it completely around the vessel, making sure to pass the string under the clamp. Again, tie the suture. As you are tightening it, remove the clamp. Finish with 3–4 more knots.



Stick tie: a more secure way to control bleeding from a blood vessel. (From Edgerton M: *Art of Surgical Technique*. Baltimore, Williams & Wilkins, 1988, with permission.)

### ***Blunt Dissection***

Blunt dissection is a technique for gently separating tissues while avoiding injury to important nearby structures such as blood vessels, nerves, or veins. Unless you use too much force, subcutaneous tissue and muscle will separate easily, while the surrounding nerves, vessels, and tendons will remain intact. For healthcare providers with limited surgical skills, blunt dissection is the technique of choice for separating tissues (for example, in exploring a wound or operating on a hand).

#### *Blunt Dissection Technique*

Insert the closed blunt tips of a scissors or the closed jaws of a clamp into the tissues (to a depth of approximately 1–2 cm). Then gently open the instrument. This action separates the tissues. Any fibrotic connections

that are not important structures can then be safely cut with the scissors. Repeat these maneuvers as needed.

Alternatively, you can gently use your index finger covered with a gauze pad to separate tissues. This technique is especially useful for elevating a skin flap off an underlying muscle.

### ***Sharp Dissection***

Sharp dissection is a technique for separating the tissues using a knife or scissors. You must be careful not to cut accidentally an important structure. For healthcare providers without surgical expertise, sharp dissection should be used primarily in emergencies, for making a hole in the neck to create an airway, or for trying to enlarge a deep hole to control life-threatening bleeding. In addition, sharp dissection is used for undermining tissues (see below) or excising a lesion.

### ***Undermining Skin Edges***

To undermine skin edges, you cut beneath the skin along the edge of a wound to free the skin from its deep tissue attachments. The purpose is to increase skin mobility, which is important for a tension-free wound closure. It is also a necessary skill for performing local flaps.

#### *Technique*

Pinch the tissues around the edge of the wound with the forceps to ensure that the local anesthetic is still working. Give additional anesthetic as required. Lift the skin edge with the forceps, and with a knife or a scissors cut into the deep subcutaneous tissue along the length of the wound (try to stay at the same depth) until the skin has the required mobility.

An alternative method involves separating the skin and subcutaneous tissue from the underlying muscle. The plane of dissection is just above the fascia, the thin layer of connective tissue that overlies the muscle. By undermining the skin along this deeper plane, you may encounter less bleeding than if you cut directly into the subcutaneous tissue layer.

### ***Bibliography***

Edgerton M: The Art of Surgical Technique. Baltimore, Williams & Wilkins, 1988.