13-169. Inhalation Burns

a. Fatal burns to the respiratory tract can occur with little or no external evidence. Toxic combustion products and inhaled chemical irritants produce varying amounts of damage depending on the nature and duration of exposure. Inhalation of superheated air by itself rarely damages the lungs because dry air conducts heat poorly and the mucous membranes of the upper respiratory tract efficiently cool the air. Furthermore, a blast of hot air causes reflex closure of the vocal cords, thus further reducing the possibility of direct thermal injury to the lower respiratory tract. Only the inhalation of steam is likely to cause thermal injury to the lung mucosa. Combustion products of some common substances, however, are very toxic to airways and alveoli and cause upper airway obstruction (due to edema), bronchospasm, and damaged pulmonary capillaries, allowing fluid to leak out of them into the alveolar spaces.

b. When taking a history from a patient exposed to fire or toxic inhalants, gather the following information:

- The nature of the inhalant or the combusted material. Many irritant gases combine with water to form corrosive acids or alkalis that cause burns of the upper respiratory tract.
- The duration of the exposure.
- Whether or not the patient was in a closed area when the exposure took place. Victims trapped in closed areas with smoke or fumes are more likely to sustain respiratory tract injury, although smoke or fumes in open areas can also result in damage.
- Whether or not the patient lost consciousness. Reflex mechanisms that ordinarily protect the lower respiratory tract may have been impaired if the patient lost consciousness.

c. During the physical examination, carefully check the face and mouth, inspecting them for burns. Auscultate the chest, listening carefully for rales and wheezes. Examine the patient's throat.

13-170. Treatment for Inhalation Burns

a. Establish and maintain an airway. Assist ventilations as needed.

b. Administer oxygen in the highest concentration available.

c. Establish an IV line with Ringer's lactate or saline at TKO rate.

d. Monitor vital signs and level of consciousness.

e. Record treatment.

f. Evacuate patient.

13-171. Artificial Airways

a. The oropharyngeal and nasopharyngeal airways are the two most commonly used airways . Each is designed for use in different situations.

b. The oropharyngeal airway is a curved device that fits over the back of the tongue and holds it away from the posterior wall of the throat (Figure 13-117). This device is inserted upside down (tip upward) into the mouth and then rotated as the tip reaches the back of the tongue. Do not push the tongue backward into the throat while inserting the airway. Do not use the oropharyngeal airway on a conscious patient. It stimulates gagging and vomiting in individuals with functioning reflexes.

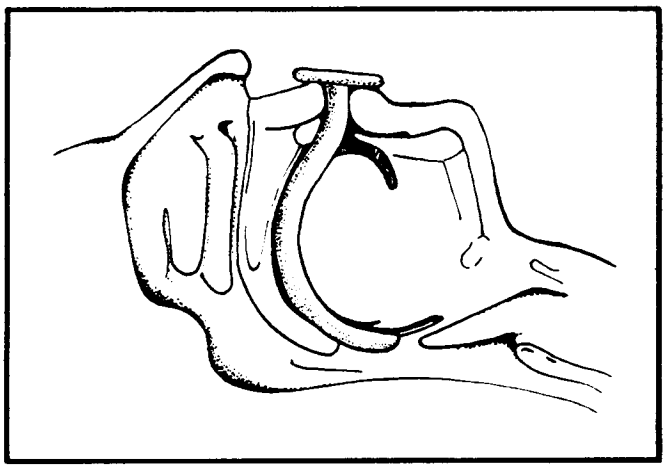

Figure 13-117. The oropharyngeal airway inserted.

c. The nasopharyngeal airway is a soft rubber tube, which is inserted through the nose into the pharynx behind the tongue, thus allowing air to pass from the nose to the lower airway. (Hard, plastic nasopharyngeal airways are unnecessarily traumatic and should not be used.) Lubricate the device with water-soluble jelly and insert it gently to avoid injury to or cause bleeding from the nasal passages. Semiconscious patients tolerate this airway more than the oropharyngeal airway.

13-172. Aids to Artificial Respirations

a. Two ventilation devices are used to treat patients requiring artificial respiration: the pocket mask and the bag-valve mask.

b. The pocket mask (Figure 13-118) with an oxygen inlet valve eliminates direct contact with the patient's nose and mouth and permits mouth-to-mouth ventilation with up to 50-percent oxygen with a flow rate of 10 liters per minute. An oxygen line connects to the mask's inlet valve. To use a pocket mask, open the patient's airway and place the rim of the pocket mask between his lower lip and chin. Retract the lip and hold the mouth open. With both thumbs along the side of the mask, clamp the remainder of the mask to the face. Grasp the jaw just beneath the angles with the fingers while maintaining a backward tilt of the head and a jaw thrust. Then exhale intermittently into the mask, forcing the breath, which is enriched with oxygen, into the patient's lungs. If the oxygen flow rate is high enough (control valve wide open), periodically occlude the opening of the mask with the tongue and allow the oxygen flow to ventilate the patient. This technique

will produce an inspired oxygen concentration much higher than 50 percent. As with any other means of artificial ventilation, when using the pocket mask, observe the chest for the rise and fall, which indicates adequate ventilation. Because both hands can be utilized by the rescuer to maintain an open airway, masks of this type are easier to use than bag-valve masks.

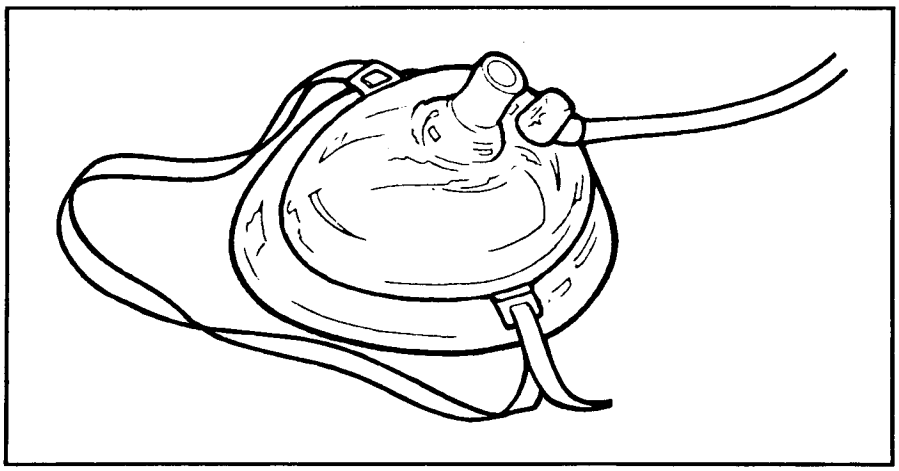

Figure 13-118. The pocket mask.

c. Bag-valve masks are self-inflating and, when used without supplemental oxygen, deliver room air (21 percent oxygen) to the patient. If an oxygen source with a flow rate of 12 liters per minute is attached to the bag-valve mask, the delivered oxygen concentration can be increased to 40 percent. Adding an oxygen reservoir to the bag can further increase the inspired oxygen concentration to about 90 percent.

d. The mask used with a bag-valve device should be transparent so that vomitus or secretions around the patient's mouth can be seen. To correctly employ the bag-valve mask—

(1) Apply the mask so that it fits snugly over the patient's chin, beneath his lower lip, and over the bridge of his nose (Figure 13-119).

(2) Place your thumb and index finger on the mask—thumb above the index finger and below the valve connection—and use the other fingers to grip the patient's mandible and form a tight seal.

(3) Tilt the patient's head back to open the airway and compress the bag with your other hand.

e. Watch for the rise and fall of the chest to be certain that ventilation is occurring. Often, an oropharyngeal or nasopharyngeal airway is desirable to keep the airway open.

Figure 13-119. Inserting the bag-valve device.

f. The bag-valve mask is more convenient and delivers a more enriched oxygen mixture than mouth-to-mouth ventilation. Keep in mind, however, that the bag-valve mask rarely generates the tidal volumes possible with mouth-to-mouth ventilation. *Gastric distension is a problem with both techniques.*

g. Bag-valve masks with oxygen supplementation may be used to assist the ventilations of a spontaneously breathing patient. Apply the mask to the patient's face in the manner described above, and gently squeeze the bag as the patient takes a breath.

13-173. Demand Valve

Manually triggered ventilation devices, or demand valves, are available in many hospitals and are acceptable for emergency use if they deliver a flow rate of at least 100 liters per minute. These devices may be connected to a mask, an endotracheal tube, or an esophageal obturator airway and are used to assist ventilation in a spontaneously breathing patient. A slight negative pressure, produced by the patient's inspiratory effort, will trigger the oxygen flow. The flow continues until the negative pressure ceases and exhaled gases exit through a nonbreathing valve.

CAUTION

When treating an apnea patient, do not use an oxygen-powered breathing device for very long with a mask because it may cause severe gastric distension. Do not use the device at all on patients under 12 years of age, except under very special circumstances, such as airway obstruction due to croup or epiglottis. Because demand valves may develop high pressures, the use of such a device with an endotracheal tube must be undertaken with caution. Bag-valve masks provide finer control of ventilation and better assessment of the patient's lung compliance.

13-174. Esophageal Obturator Airway

a. The esophageal obturator airway is a long tube that superficially resembles an endotracheal tube. It is open at the top, sealed at the bottom, and contains numerous holes on the side near its upper end. A mask fits over the tube at its upper end, and an inflated cuff is located near its bottom end. When the esophageal airway is properly placed and the mask is seated firmly on the face, air that is blown in by mouth or bag-valve mask will enter the patient's pharynx through the side holes in the obturator. Since the inflated cuff obstructs the esophagus, and the mask seals off the mouth and nose, air can only travel into the trachea. Thus, the esophageal obturator prevents progressive gastric distension during assisted ventilation and also lessens the regurgitation of stomach contents. Using the esophageal airway, however, is not without hazards. Rough handling during insertion may damage structures in the pharynx, and excess inflation of the cuff may rupture the esophagus.

b. To insert the airway, place its top end through the port of the supplied face mask. Many of these masks have inflatable rims, which should be fully inflated before the airway is inserted. Slightly flex the patient's head and pull the jaw forward while the cuffed end of the tube is gently advanced into the esophagus until the mask sits firmly on the face (Figure 13-120). If the mouth is dry, the end of the obturator may need to be lubricated with a water-soluble jelly. Never jam the tube down. If you meet resistance, gently pull the tube back and try to advance it again. In most cases, the tube will follow the natural curvature of the throat and move easily into the esophagus. But because it is always possible to inadvertently intubate the trachea with this device, check the location of the tube: Tilt the patient's head back, hold the mask in place, ventilate through the airway, and watch the chest to see if it rises and falls. If the chest moves, the tube is in the esophagus, and the cuff can be inflated with 20 to 30 ml of air. To recheck the position of the esophageal airway, ventilate the chest again and listen for breath sounds. If there is no chest expansion or if breath sounds are absent, the airway may be lodged in the tachea. If this is the case, remove the airway at once (cuff deflated) and continue ventilation by another method. Try again to reinsert the obturator.

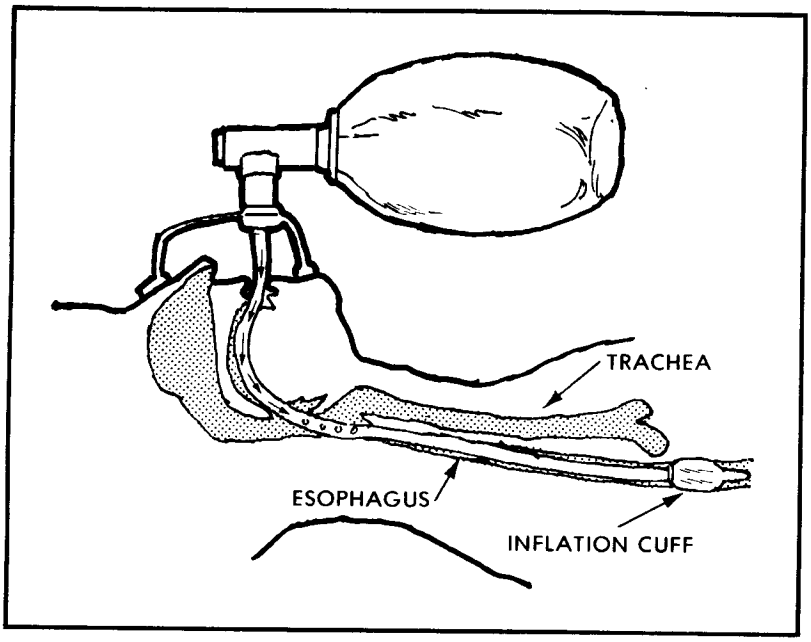

Figure 13-120. The esophageal obturator airway.

c. Observe these important guidelines when using the esophageal obturator airway:

(1) Use the esophageal airway only in unconscious patients. Its use causes gagging and vomiting on conscious and semiconscious patients.

(2) Do not use the esophageal airway on patients less than 16 years old or 5 feet tall.

(3) Do not use the esophageal airway on patients who have esophageal disease, cirrhosis of the liver, or who have ingested caustic substances.

(4) Do not remove the esophageal obturator airway from an unconscious patient until the airway has been secured with an endotracheal tube. Removal of the esophageal airway results in considerable regurgitation of stomach contents. Unless the trachea has first been protected with a cuffed endotracheal tube, regurgitated material will enter the lungs.

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CHAPTER 14

CLINICAL PROCEDURES

Section I. INTRODUCTION

14-1. General

Providing casualties with immediate medical treatment on the battlefield is only one phase of your responsibilities as a medical specialist. When you are assigned to a clinic, hospital, or other medical treatment facility, you will be confronted with a number of different or unique treatment requirements on a daily basis. The clinical environment presents an entirely new set of patient care situations with which you will have to deal.

14-2. Your Role in Clinical Care

The importance of your role in patient care cannot be over-emphasized. Your technical skill and knowledge are major contributing factors in an individual patient's rapid and successful recovery. The techniques and procedures explained in the following sections are those that you will be working with in the course of your normal duties. They represent a wide selection of the treatment situations to which you will be exposed. While many of these procedures appear to require little, if any, explanation, they are fundamentally important and will serve as reference and review material.

Section II. VITAL SIGNS

14-3. General

Temperature, pulse, respiration (TPR), and blood pressure (BP) are called vital signs because they are important signs that indicate a patient's condition. Measurement of these signs aids in making a diagnosis and prescribing treatment. Any marked deviation from the normal range is a signal of distress from the body; the interpretation of changes is as important as the measurement itself.

14-4. Body Temperature

Body temperature is the result of a balance between the heat produced and the heat lost by the body. The hypothalmus is that portion of the brain that regulates body temperature by speeding up or slowing down the cells use of food (metabolic rate). The higher the rate of metabolism, the more heat the body produces. This heat is distributed by the circulating blood. Excessive heat is eliminated through the skin, lungs, and excreta. When the balance is disturbed, deviations in body temperature result.

a. Normal Temperature. Body temperature ranges between 96 and 100°F. The normal, or average, temperature of most people is 98.6°F. The temperature reading that you obtain will vary according to the site you use. The average oral temperature is 98.6°F. Rectal temperature is usually about one degree higher (99.6°F), and the axillary (armpit) temperature is about one degree lower (97.6°F) than when measured orally. A range of 0.5-1.0°F from the average normal temperature is usually considered to be within normal limits. When the body temperature changes from the normal average, it warns of body malfunction, infection, or dehydration.

b. Abnormal Temperature.

(1) Pyrexia (fever) is an elevation in temperature above the normal average. During pyrexia, heat is produced faster than the body can eliminate it. Fever is a common symptom of infection or other disease.

(2) Hypothermia is a deviation in temperature which persists below the average normal temperature. A subnormal temperature may be caused by shock, starvation, or a long-lasting illness. It indicates that body resistance to disease is low.

14-5. Measuring Body Temperature

a. The body temperature can be measured by the mouth, the rectum, or the axilla (armpit). The method used depends on patient's age, physical condition, and equipment available.

b. The clinical thermometer is a glass bulb containing mercury and a stem in which the mercury can rise. On the stem there is a graduated scale representing degrees of temperature with the lowest indicating 94°F and the highest 106°F. Two types, oral and rectal, are commonly used. Various manufacturers color code the tips of the thermometers for proper identification: blue tip for oral usage (Figure 14-1A) and red tip for rectal usage. The standard rectal thermometer (Figures 14-1B and 14-1C) comes in two shapes that are specifically designed to prevent perforation of the anus or the rectum.

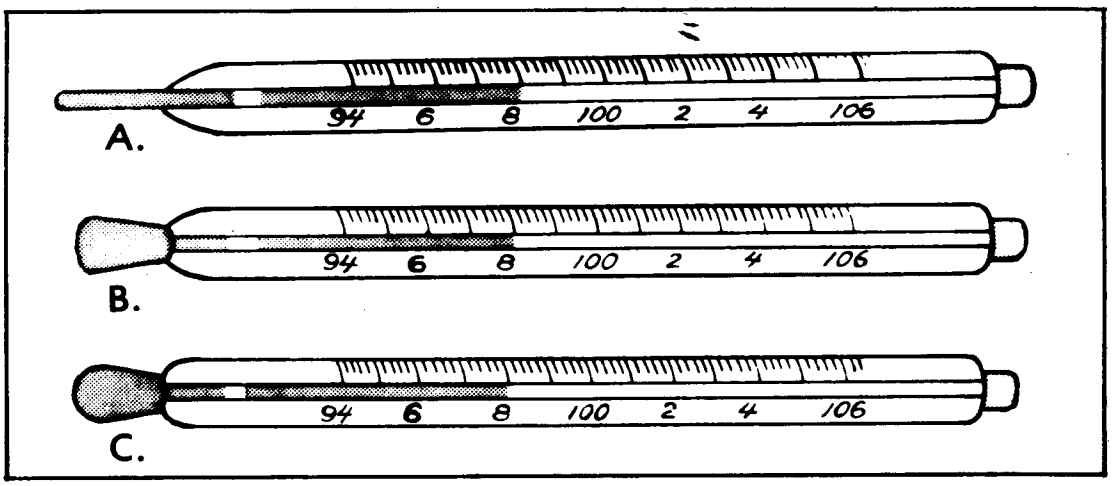

Figure 14-1. Clinical thermometers (oral and rectal).

14-6. Reading the Thermometer

The stem of the mercury-in-glass thermometer contains a temperature measuring scale. The scale has an arrow marking the normal temperature of 98.6°F. Long lines on the scale represent each degree, with only the even-numbered degrees written (for example, 94, 96, 98, 100). Short lines between

degree lines represent 0.2 (two tenths) of a degree. All temperatures are recorded as ending in an even number when using this thermometer (98.2°F, 99.6°F) because it does not measure in odd tenths. To read a clinical thermometer:

a. Hold the thermometer by the stem at eye level.

b. Notice the ridge side with numbers below and lines indicating number of degrees above (long lines = one degree; short lines = 0.2 of a degree).

c. Rotate the thermometer back and forth slowly until you can see the silver mercury strip.

d. Compare mercury strip level to printed markings.

14-7. Methods of Measuring Temperature Using Clinical Thermometers

a. Oral Temperature (Figure 14-2). This is the most convenient method and can be used for responsive adult patients. Before taking an oral temperature you should ask the patient if he has recently had any food or drink or if he has been smoking. If so, wait 15 minutes before taking the temperature.

CAUTION

When handling thermometers, handle by the stem end only.

(1) Wash your hands.

(2) Check thermometer to be sure it is clean and dry. Shake it down to 94°F if necessary. When shaking down the thermometer, grasp the stem end firmly and with a sharp downward wrist motion, shake the thermometer. Check the mercury column and repeat the shaking procedure, if necessary, to lower the column to the 94°F mark.

(3) Place bulb end under the patient's tongue (Figure 14-2A). Instruct him to close lips firmly around stem, but not to bite down (Figure 14-2B). Leave thermometer in place at least 3 minutes.

(4) Remove thermometer. Wipe with a gauze tissue from stem to bulb to remove any saliva. Read and record the temperature, using decimals (for example, "98.4°F").

(5) Place thermometer in "used" oral thermometer holder.

b. Rectal Temperature. This is the most accurate method. It is used for all infants and young children and for adults who are unconscious, irrational, or who have difficulty breathing with the mouth closed. It is *not* used on patients who have had rectal surgery or have a rectal disorder.

(1) Provide patient privacy (if possible). Then turn him on his side (Sims position) and expose the buttocks. The top knee should be flexed (bent).

(2) Insure that the tip of the thermometer is well lubricated. Use sterile lubricant for this procedure.

(3) Lift the upper buttock to expose the anus. Insert the well-lubricated bulb of the thermometer slowly and carefully about 1 1/2 inches into the rectum (Figure 14-3).

(4) *Hold thermometer* in place for 2 minutes.

(5) Remove thermometer. Wipe downward with a gauze tissue from stem to bulb. Read and record temperature, using the decimal followed by the initial R (for example, "99.8°F(R)").

(6) Place rectal thermometer in "used" holder.

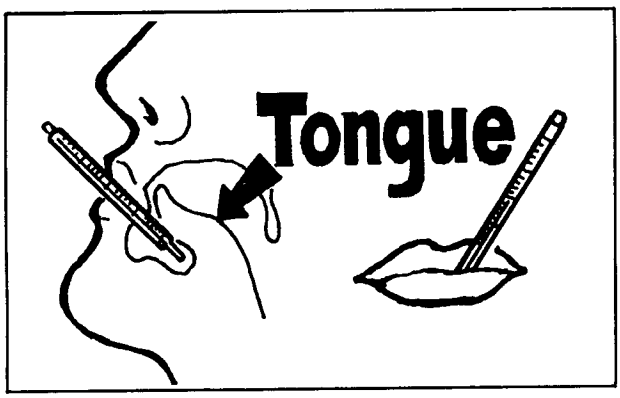

Figure 14-2. Measuring patient's oral temperature.

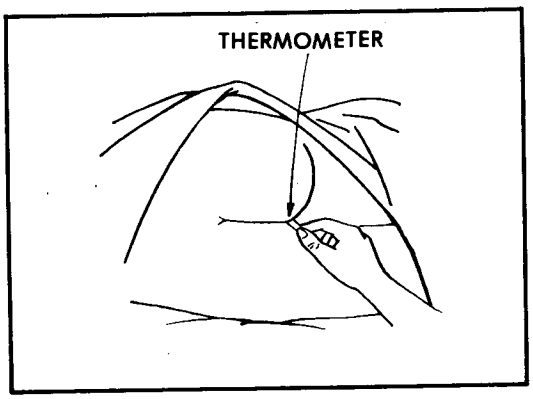

Figure 14-3. Insertion of the thermometer into patient's rectum.

NOTE

Instruct the patient to take a deep breath; this will relax the anal sphincter and allow easier insertion of the thermometer.

c. *Axillary Temperature.* When temperature can be taken neither orally nor rectally, it can be taken under the arm where the thermometer bulb can be surrounded by body tissue. To take the axillary (armpit) temperature, use an oral thermometer.

(1) Pat the armpit dry with a tissue or towel. Place the bulb of the oral thermometer in the center of the armpit and pointed towards the patient's head.

(2) Fold the patient's arm across his chest with his fingers on the opposite shoulder (Figure 14-4).

(3) Leave thermometer in place for at least 10 minutes.

(4) Remove thermometer. Read and record temperature, using the decimal followed by the initial A (for example, "100.2°F(A)").

(5) Place thermometer in "used" holder.

Figure 14-4. Take an axillary temperature.

14-8. Care of Thermometers (Clinical Environment)

a. Remove contaminated thermometers from "used" holder.

b. Cleanse thermometers with gauze pad soaked with Wescodyne/ Betadine solution. Cleanse each thermometer with a twisting motion from stem to bulb. Rinse the thermometer under cool running water (if available) or with a gauze pad saturated with water. Use a twisting motion from stem to bulb.

CAUTION

Most thermometer contamination is at the bulb end due to patient contact. Do not retrace or backtrack cleansing the thermometer. Doing so would recontaminate the thermometer.

c. Place thermometers in a basin of Wescodyne solution, 150 ppm, for 30 minutes.

d. Wash and dry thermometer holders. Place layer of cotton or gauze pads in the bottom of each.

e. Remove thermometers from Wescodyne solution, rinse under cool running water and dry.

f. Shake down thermometers to at least 94°F and return to "clean" holder.

NOTE

If using thermometer tray, all containers should be disinfected at least once daily. Wescodyne solution should be changed daily or more often if needed.

14-9. Care of Thermometers (Field Expedient Method)

When assigned as an aidman to a TOE unit, you may have to modify the method of disinfecting thermometers while on field maneuvers. Prior to taking a patient's temperature, the thermometer should be thoroughly cleansed.

a. Remove thermometer from its plastic holder.

b. Cleanse thermometer with 70 percent isopropyl alcohol pad. Use a twisting motion to clean from stem to bulb end.

c. Rinse the thermometer with cool water or with a gauze pad saturated with water. Use a twisting motion from stem to bulb end.

d. Skake down thermometer to at least 94^{O}F.

NOTE

This procedure is to be used prior to taking patient's temperature and after temperature is taken.

14-10. Pulse

Pulse is defined as the rhythmic expansion and contraction of an artery. This action is caused by the beating of the heart. When the heart contracts (systole), the blood is forced from its chambers into the arteries. This action causes the arteries to dilate (expand). When the heart relaxes (diastole), blood refills its chambers. This action causes the arteries to contract, or recoil, as the blood moves further along in the circulatory system. A patient's pulse is measured to aid in determining his condition by comparing it with a normal heart rate.

14-11. Palpation of the Pulse

The pulse can be felt at points where an artery lies close to the skin or where it crosses over a bony area or hard tissue. The pulse sites (Figure 14-5) can be found—

a. At the wrist, proximal to the thumb (radial artery), on the palm side of the hand.

b. At either side of the neck, near the windpipe (carotid artery).

c. On the inside of the elbow about 1/2 inch proximal to the elbow point (brachial artery).

d. Below the left nipple (5th intercostal space (apical artery)).

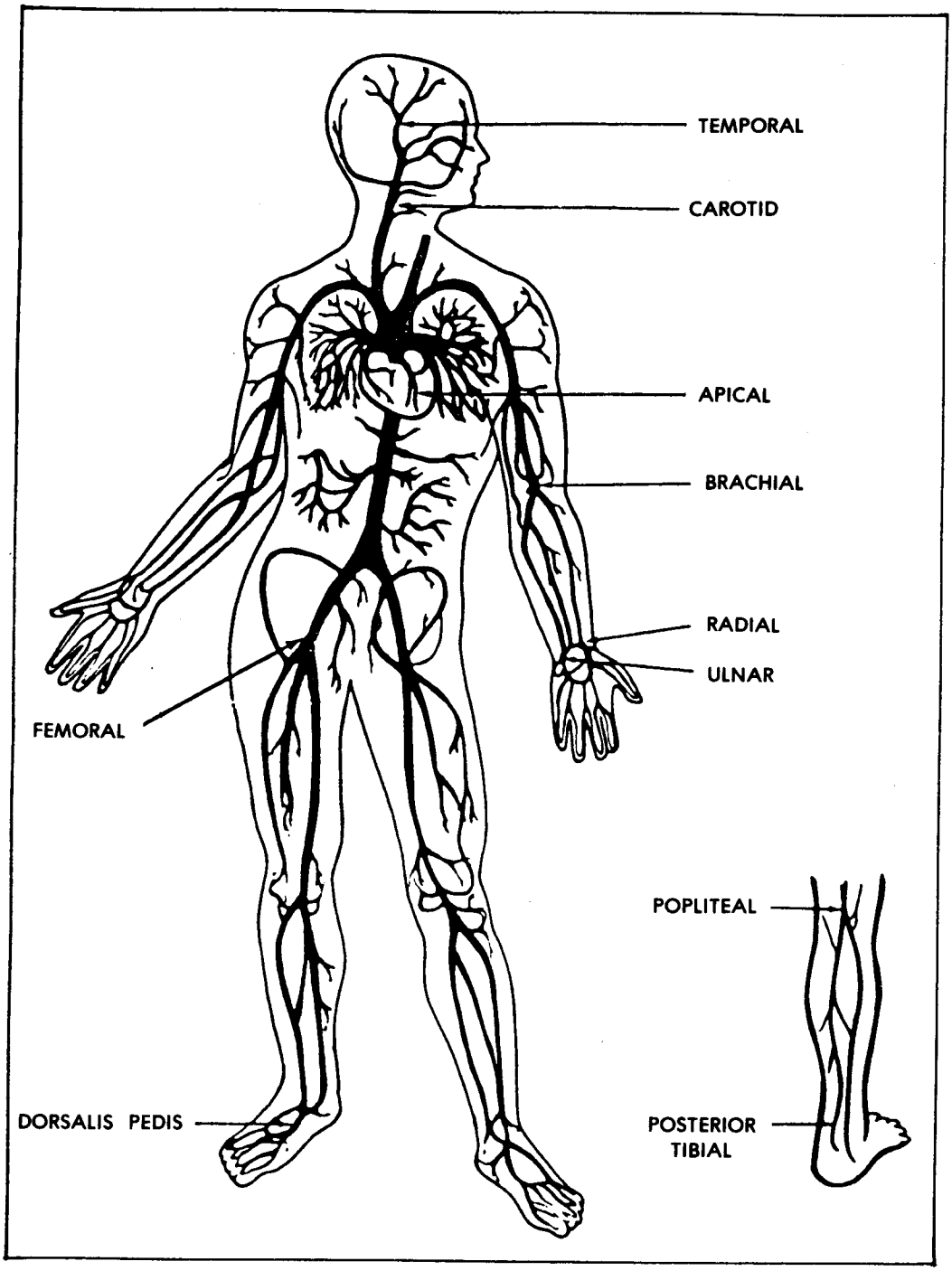

Figure 14-5. Pulse sites.

e. In front of the ear (temporal artery).

f. In the middle of the groin and leg joint (femoral artery).

g. In the center of the back of the knee along the inside medial tendon (popliteal artery).

h. Behind the inner ankle bone (posterior tibial artery).

i. Along the top (dorsum) of the foot (dorsalis pedis artery).

14-12. Pulse Rate

a. Normal Pulse Rate. Generally, the normal pulse is regular in rate, rhythm, and force (strength). A strong pulse is easily detected by the large amount of blood being pumped. The average range is between 60 and 100 pulse beats per minute. The rate of the normal pulse varies slightly in individuals as indicated in Table 14-1.

Table 14-1. Pulse Rates.

Commonly Accepted Pulse Rates	*Beats per Minute*
Normal pulse range	60 to 100
Some athletes	45 to 60
Adult males	72
Adult females	76 to 80
Child, age 5	95
Child, age 1	110
Newborn infant	115 to 130

b. Abnormal Pulse Rate.

(1) Bradycardia is a pulse rate below 60 beats per minute. A patient with heart disease may have a slow heart beat due to intake of cardiac drugs, such as digitalis. Athletes will tend to have a "normal" pulse rate of less than 60 beats per minute.

(2) Tachycardia is a pulse rate of over 100 beats per minute. Conditions causing the heart rate to rise are emotion, pain, exercise, excessive heat, fever, bleeding, and shock, which may raise the heart rate above normal, thus increasing the pulse rate.

14-13. Characteristics of Pulse Beats

When you count the pulse, the rate, rhythm, and force should be noted. There are several means of describing the characteristics of a pulse.

a. Pulse is normal when it is even in rate, rhythm, and force (strength) (Figure 14-6).

b. An irregular pulse is one that has a period of normal rhythm broken by periods of irregularity or skipped beats (Figure 14-7).

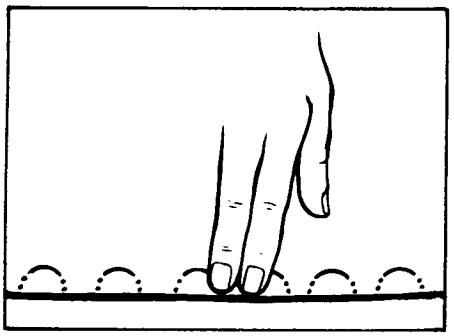

Figure 14-6. Regular pulse.

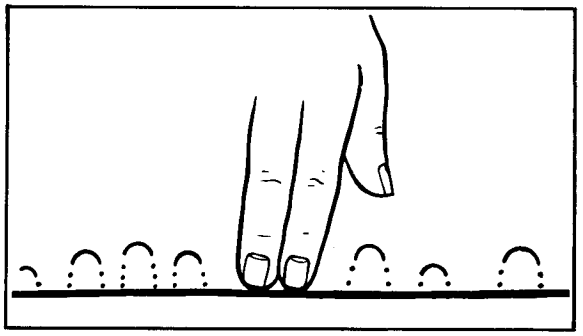

Figure 14-7. Irregular pulse.

c. A bounding pulse (Figure 14-8) occurs when exceptionally strong heartbeats make arteries difficult to compress. This may be caused by exercise, anxiety, or alcohol.

d. A pulse is weak, thready, or feeble (Figure 14-9) when only small amounts of blood are being pumped through the arteries.

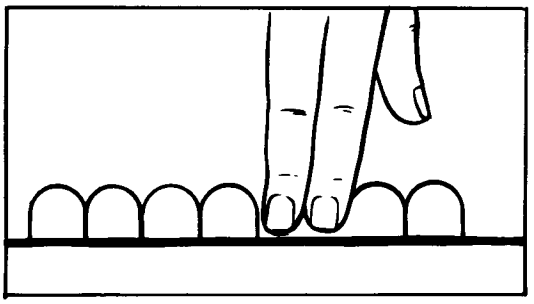

Figure 14-8. Bounding pulse.

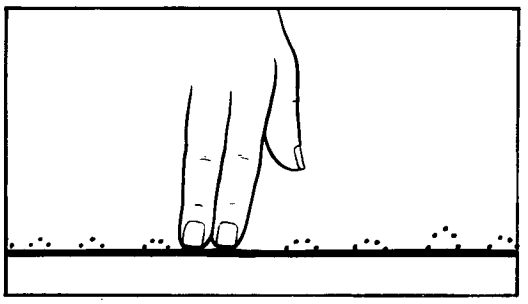

Figure 14-9. A weak, thready pulse.

14-14. Procedure for Measuring and Recording a Patient's Pulse

a. Position the patient either lying down or seated comfortably in a chair with palms up.

b. Locate the pulse point that is easiest to reach and use. Usual pulse sites are the radial, brachial, and carotid sites.

c. Palpate the pulse site by placing either the fingertips of index and middle fingers on pulse point, or index, middle, and ring fingers on pulse point (Figure 14-10).

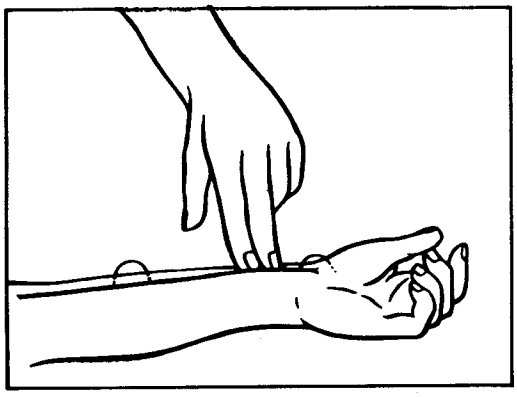

Figure 14-10. Palpating a radial pulse.

d. Count pulse for 1 full minute. Note rate, rhythm, and force (strength).

e. Record the pulse and report as appropriate.

14-15. Respiration

Respiration, commonly called breathing, is the process by which oxygen (0_2) and carbon dioxide (CO_2) are interchanged by the body. External respiration refers to the delivery of oxygen (0_2) to the lungs so that it can be taken into the blood stream. Internal respiration is the process by which oxygen from the blood is taken to the cells in the body and carbon dioxide (CO_2) is removed from tissues and carried into the blood. Both conscious and unconscious (involuntary) control of respiration is the function of a respiratory center in the brain (medulla oblongata).

a. Inhalation is the process of taking air into the lungs. During inhalation, the diaphragm descends as it contracts and the rib cage is lifted upward and outward, giving the lungs more room to expand and create a slight vacuum in the chest that draws air into the lungs.

b. Exhalation is the process of expelling air from the lungs. During exhalation, the diaphragm rises as it relaxes and the rib cage is drawn down and inward as air rushes out of the lungs.

14-16. Normal Breathing Rates

Normal breathing (eupnea) is easily done and does not require conscious thought. Normal respiratory rates are typically one-fourth of the normal heart rate. Respiratory rates vary according to age; the following are commonly accepted as being the normal limits:

	Respirations per Minute
a. Healthy adult	12 to 20
b. Adolescent youth	18 to 22
c. Children	22 to 28
d. Infants	30 or more

14-17. Patterns of Breathing

a. Normal Respiration. A normal, relaxed breathing pattern is effortless, evenly paced, regular, and automatic. Increased levels of carbon dioxide or lower levels of oxygen in the blood trigger an increase in the respiratory rate to restore the chemical balance and rid the body of excess carbon dioxide.

b. Abnormal Respiration. A head injury or any increased intracranial pressure (ICP) will depress the respiratory center and result in shallow or slow breathing. Certain drugs also tend to depress the respiratory rate (for example: Morphine, Demerol).

c. Breathing Variations.

(1) *Dyspnea:* Difficult and labored breathing, often with flared nostrils, anxious appearance, and statements such as "I can't get enough air." It is important to know how much exertion or activity causes the dyspnea. Does it occur when walking, trying to eat a meal, or when trying to talk?

(2) *Tachypnea:* Increased or rapid breathing; may be seen in fever and in a number of other diseases. Breathing rate increases markedly for each $1^{O}F$ increase in temperature.

(3) *Slow and shallow:* There is a limited amount of air exchanged and less oxygen is taken in. This type of breathing often leads to hypoxia, or decreased levels of oxygen in the blood. It is often seen in patients who are under sedation, recovering from anesthesia, have had abdominal surgery, or are in a weak or debilitated condition.

(4) *Cheyne-Stokes respirations:* A pattern of dyspnea followed by a short period of apnea (no respiration). Respirations are rapid and gasping in nature for about 30 to 45 seconds, then are followed by a period of no breathing for about 20 seconds. It is seen in critically ill patients with brain conditions, heart or kidney failure, or drug overdose.

(5) *Hyperventilation:* A pattern of breathing in which there is an significant increase in the rate of breaths and carbon dioxide is expelled from the body, causing the blood level of CO_2 to fall. The condition is seen after severe exertion and during high levels of anxiety or fear and with fever and diseases such as diabetic acidosis.

(6) *Kussmaul's respirations:* The increased rate and depth of respirations, with panting and long, grunting exhalation. It is frequently seen in diabetic acidosis and renal failure.

d. Noisy Respirations. As a rule of thumb, you should regard any noisy respirations as obstructed breathing. Some of the terms used to describe noisy respirations are—

(1) *Rales and rhonchi:* Rattling sound caused by secretions in the lung passageways.

(2) *Stertorous:* A snoring sound produced when patients are unable to cough up secretions from the trachea or bronchi.

(3) *Stridor:* A crowing sound on inspiration due to the obstruction of the upper air passageways as occurs in croup or laryngitis.

(4) *Wheeze:* A whistling sound of air forced past a partial obstruction as found in asthma or emphysema.

14-18. Procedure for Measuring and Recording a Patient's Respirations

For an accurate accounting of the respirations, the patient should be at rest and unaware of the counting process. If adult patients are aware that you are counting their respirations, they may voluntarily breathe faster or slower. The most satisfactory time to count respirations is after the patient's pulse count.

a. After taking the pulse, continue holding the patient's wrist. Lay the patient's arm across his chest.

b. Count respiratory rate for 1 full minute. Observe rate, depth, patterns, and sounds of respiration.

NOTE

One respiration includes both the inhalation and expiration.

c. Record the respirations and report as appropriate.

14-19. Blood Pressure

Blood pressure (BP) may be defined as the pressure exerted by the blood on the walls of the vessels. All parts of the vascular system are under pressure, but the term "blood pressure" usually refers to arterial pressure. The pressure is the product of (1) the force of the contraction of the ventricles of the heart, (2) the amount of blood pumped out of the heart, and (3) the resistance of the blood vessels to the flow of blood through them. By measuring the blood pressure, you obtain information about the effectiveness of the heart contractions, the adequacy of the blood volume in the system, and the presence of any obstruction or interference of flow through the blood vessels.

14-20. Normal Ranges of Blood Pressure

Blood pressure consists of the systolic pressure written as a fraction over the diastolic pressure. The systolic pressure is the level present during contraction of the heart. Diastolic pressure is the pressure during relaxation of the heart. The average blood pressure in a healthy young adult is considered to be 120/80 mm of mercury (Hg); 120 is the systolic pressure, 80 is the diastolic pressure.

Just as pulse and respiratory rates vary among individuals, so does blood pressure. The normal blood pressure range is—

MALE		FEMALE	
Systolic	100-140	Systolic	90-130
Diastolic	60-90	Diastolic	50-80

14-21. Factors Influencing Blood Pressure

As a result of the many factors influencing it, the blood pressure is a dynamic force that can vary from minute to minute as the heart adjusts to demands and responses of the body and brain. Many factors exert an influence on blood pressure:

a. Age: Blood pressure is lower in children than it is in adults.

b. Sex: Blood pressure is higher for men than women of the same age level.

c. Body Build: Obese persons usually have higher blood pressure than do those who are of average weight and build.

d. Exercise: Exertion temporarily elevates blood pressure.

e. Pain: Pain will usually elevate blood pressure.

f. Emotion: Fear, worry, or excitement will elevate blood pressure.

g. Drugs: Vasoconstrictors elevate blood pressure. Vasodilators decrease blood pressure. Narcotics decrease blood pressure.

h. Disease: Any disorder affecting the circulatory or renal system may increase blood pressure. A disease that weakens the heart may lower the blood pressure.

i. Hemorrhage: Decrease of blood volume lowers blood pressure and may lead to shock.

j. Intracranial Pressure: Pressure in the space between the skull and the brain can elevate blood pressure.

14-22. Abnormalities of Blood Pressure

a. Hypertension. Pressure elevated above the normal range is called hypertension. Prolonged hypertension can cause permanent damage to the brain, the kidneys, the heart, and the retina of the eye.

b. Hypotension: Low blood pressure is called hypotension. Hypotension associated with symptoms of shock or circulatory collapse is a dangerous condition that can rapidly progress to death unless treated.

14-23. Blood Pressure Measurement

Blood pressure is measured with a sphygmomanometer (an air-pressure device) (Figure 14-11) and a stethoscope (Figure 14-12). The cuff of the sphygmomanometer contains an oblong rubber bag or bladder. When the cuff is wrapped around the upper arm or the midthigh and inflated with air, the air pressure registers on the sphygmomanometer gauge. Taking a blood pressure requires practice. The individual must apply the cuff properly, manipulate the air bulb, and simultaneously listen through the stethoscope while watching the gauge.

NOTE

The pressure readings are in millimeters (mm) of mercury (Hg).

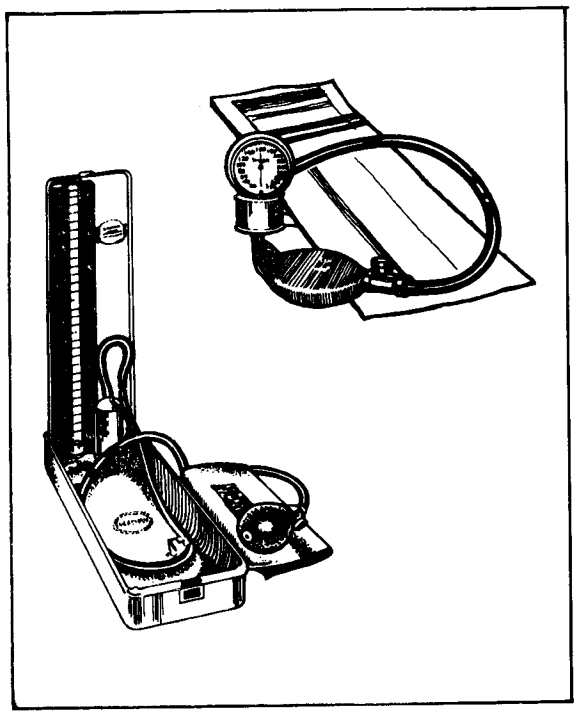

Figure 14-11. Sphygomomanometer (aneroid and mercury illustrated).

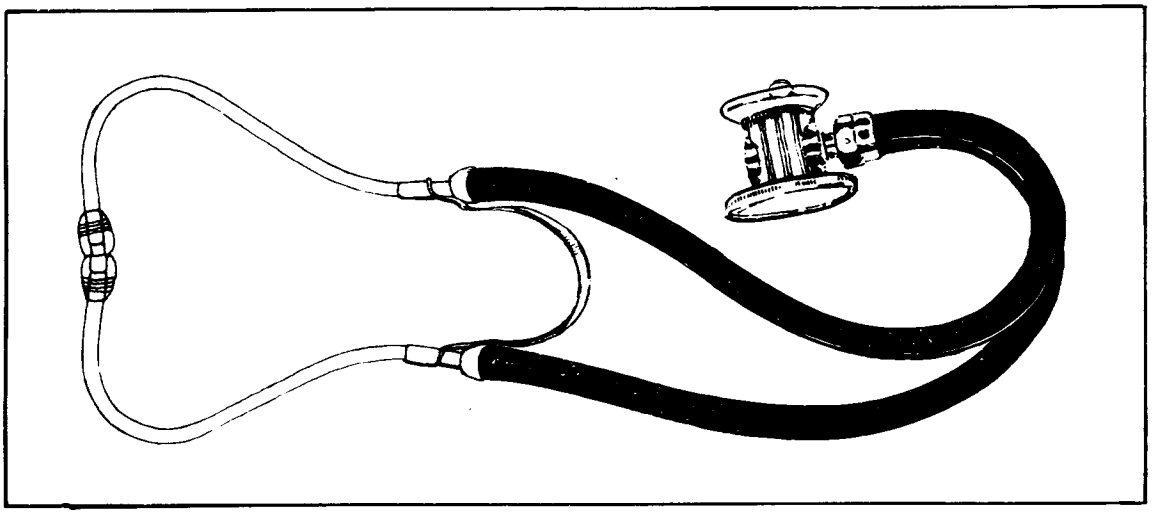

Figure 14-12. Stethoscope.

14-24. Procedure for Measuring and Recording a Blood Pressure Using the Brachial Artery

Determining blood pressure by auscultation is the most common method for determining blood pressure as a stethoscope is used to listen for characteristic sounds.

NOTE

Insure that cuff is completely deflated and the gauge registers zero.

a. Decontaminate stethoscope. Clean earpieces and diaphragm with 70 percent alcohol swabs and cotton-tipped applicators.

b. Explain procedure to the patient. Many people may be fearful of the technique, thinking it will be harmful or painful. Ask your patient if he has had his blood pressure measured before. If not, make him aware of the sensations that accompany the technique, most notable the discomfort caused by the cuff as it is inflated.

c. Position the patient.

(1) Patient should be seated or lying down.

(2) Support the arm to be used, palm up, at the level of the patient's heart.

CAUTION

If injured, patient should not be moved simply for the purpose of determining blood pressure. To do so may aggravate existing injuries. Blood pressure should be measured without moving the patient.

d. Expose the patient's upper arm. Remove garment if sleeve is tight.

e. Place the cuff on the patient's arm (Figure 14-13). Position the cuff 1 to 2 inches above the elbow. Apply the cuff securely but not overly tight.

(1) If using aneroid-type manometer, clip the gauge to the cuff in line with palm.

(2) If using mercury manometer, place column on a firm, level surface, outside patient's field of vision.

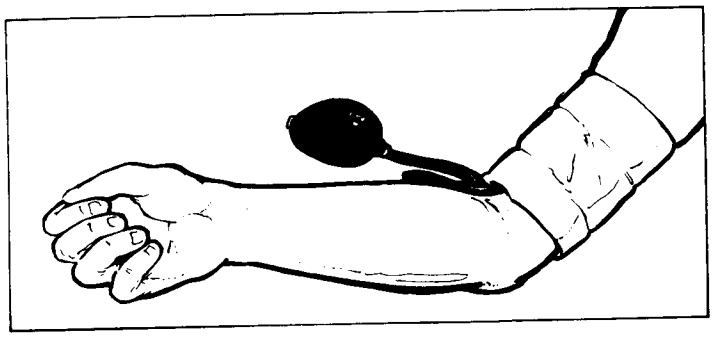

Figure 14-13. Cuff placement.

f. Locate pulse of brachial artery by palpating in the bend of the elbow.

g. Place the bell or diaphragm of the stethoscope over the pulse point (Figure 14-14). Do NOT apply the bell or diaphragm too firmly; excessive pressure distorts the pulse sounds.

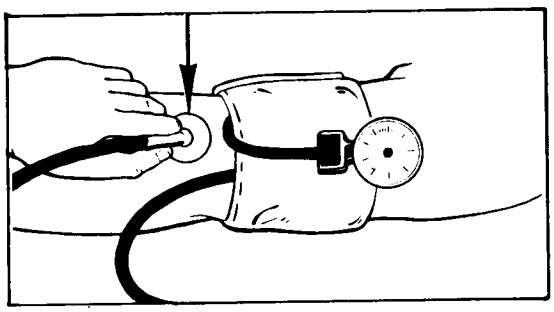

Figure 14-14. Placing the stethoscope.

h. Tighten thumbscrew of air bulb (clockwise) with one hand while holding stethoscope in place with other hand.

i. Inflate the cuff by pumping air bulb (Figure 14-15). You will hear the pulse sounds as the pressure in the cuff increases, then the sounds will disappear. Continue inflating the cuff until the pressure gauge indicates about 20-30 mm above where pulse sounds were last heard. It is at this point that the air pressure has caused the arterial wall to collapse.

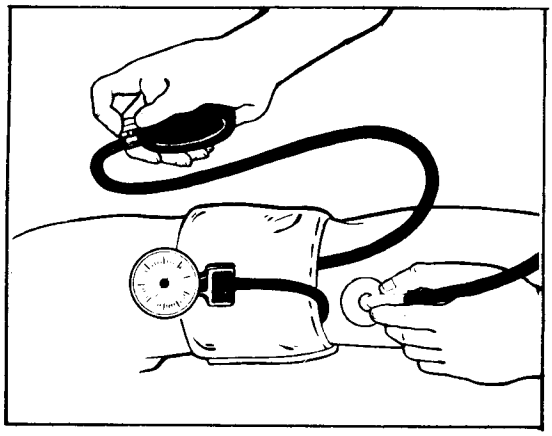

Figure 14-15. Inflating the cuff.

j. Loosen thumbscrew of air bulb (counterclockwise) and allow the air to escape slowly (about 2-4 mm Hg per second). At the same time, watch the gauge. When the first distinct sound is heard, note the number on the gauge; this is the systolic pressure.

k. Continue to release the air slowly. *Look and listen.* Note the number on the gauge at which the last distinct sound is heard. This is the diastolic pressure.

CAUTION

In some patients, sounds may be heard to extremely high or low levels.

Section III. ASEPSIS

14-25. General

a. Microorganisms abound in the world and people are constantly bombarded by them. Only a small percentage of the many types of microorganisms, called pathogens, cause disease; exposure to pathogens does not always lead to illness. Hospitals are potential reservoirs for countless microorganisms, both pathogenic types brought in by patients with infectious diseases and nonpathogenic types normally carried by everyone. Health care personnel must be continually vigilant in their efforts to control the growth of organisms and prevent infections. The most efficient methods are those aimed at controlling the factors causing infections. For example, reducing the number of organisms in the patient's environment is accomplished by good housekeeping procedures, frequent handwashing, and use of aseptic techniques. Virulence, which is the strength of the organism to cause disease, is difficult to control in rapidly growing organisms. The medical focus is aimed first at destroying the invading organism as quickly and completely as possible, and second, at treating the symptoms of the disease. Patients who

are ill or who have undergone the stress of surgery are less resistant to pathogenic organisms. Health care personnel must use their knowledge and skills to reduce the stresses affecting their patients and protect them against hospital-acquired infections.

b. An understanding of aseptic technique and the ability to use it correctly is an important means of providing for the patients' safety and welfare. In this section are the principles of asepsis and the procedural skills involved in maintaining a sterile field, using sterile instruments, opening sterile packages, putting on sterile gloves, and changing sterile dressings.

14-26. Invasion by Pathogens

a. In spite of modern antibiotic drugs, infections pose an ever-present potential danger to human beings. Infection develops when pathogens invade the body and overcome its defenses. Specific information about pathogens (which are classified as bacteria, viruses, protozoa, helminths, and fungi), their characteristics, and the diseases they cause can be found in books on microbiology.

b. The skin and mucous membranes provide the first line of defense against infection. They protect our bodies from external sources of harm, such as heat, cold, radiation, chemicals, and microorganisms. Under normal conditions, countless microscopic organisms exist on the surfaces of the skin, respiratory passages, the alimentary tract, and the vagina. When any of these surfaces are broken or injured, pathogens enter the body, where they seek out tissues suited to their specific needs and then proceed to multiply. As the pathogens multiply, they damage the normal cells, and the body's response to the damage gives rise to the symptoms of disease.

14-27. The Development of Infection

a. Health care personnel need to examine the way organisms spread, how infections occur, and how the body responds to cellular injury, in order to understand and effectively use aseptic technique as a major intervention. Pathogenic organisms wait, live, and multiply in reservoirs that may be human, animal, or nonanimal. However, the most common source of pathogens is another infected person.

b. In the infectious cycle, pathogens must escape from their reservoir and find another suitable host. Organisms are transmitted in the following ways:

(1) Transfer to host via—

- *Direct contact* with an infected person, contaminated instruments, or supplies.
- *Vectors* (carriers) may be human, animal, or insect.
- *Fomites,* inanimate objects that support organisms, such as furniture, clothing, food, milk, or water.

- *Air currents*, such as those produced by coughs, sneezes, draft, or air conditioning.

(2) Enter the body via—

- Open wounds in the skin.
- Open wounds in mucous membranes.
- Gastrointestinal tract.
- Respiratory tract.
- Genitourinary tract.

(3) Leave the body via—

- Open wounds.
- Gastrointestinal tract.
- Respiratory tract.
- Blood.

c. In health care settings and hospitals, there is a high potential for pathogenic organisms to cause infections, whether in patients or in health care personnel (Figure 14-16). Laxity in handwashing between visits to patients, careless handling of soiled articles, and contamination of wounds readily lead to infection. The development of an infection depends on three factors:

- The number of organisms entering the body.
- The virulence of the organisms.
- The resistance of the host.

Principles relative to these factors are basic to preventing and controlling infections, through the use of medical asepsis (isolation precautions) and the use of surgical asepsis (including reverse isolation).

14-28. Body Response to Injury

a. Inflammation is the body's response to any type of tissue injury. The injury can be biological (caused by microorganisms), chemical, or physical, caused by trauma, heat, cold, or radiant energy. The internal defenses are mobilized to localize the organisms and to limit the effects of the cellular damage. These defenses involve vascular changes, hormonal response, and increased white blood cells. Vascular changes produce the signs of the inflammatory process: swelling or edema of the injured part; redness owing to the increased blood supply; heat or increased temperature; pain stemming from pressure on nerves; and loss of function resulting from all of these changes. Some signs of inflammation—that is, swelling, redness, heat, pain,

and loss of function—may not be readily seen when internal organs or tissues are involved, but they are present to some degree. The signs and symptoms of the disease itself are partly due to the inflammatory process. Knowledge of the inflammatory process enables the medic to assess the patient more completely. If even one sign of inflammation is present, the alert medic can look for other signs to determine whether the patient has an infection.

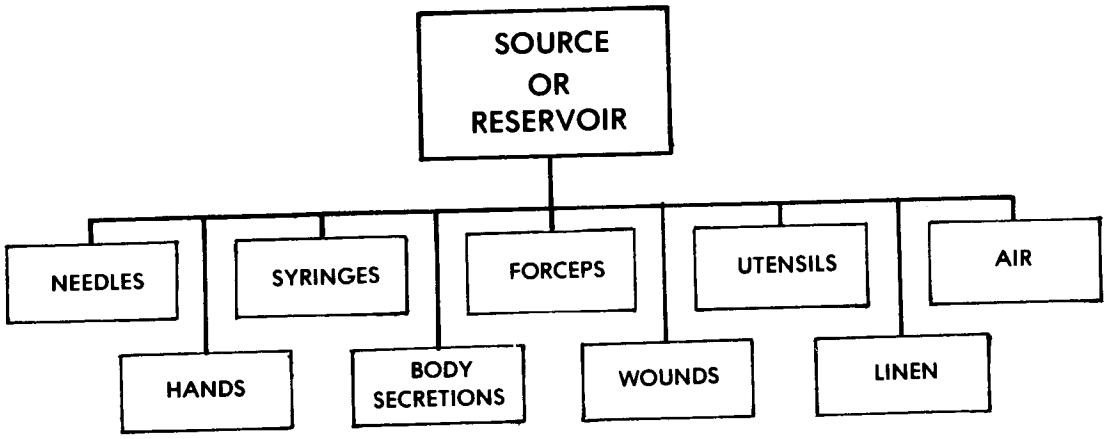

Figure 14-16. Common modes of transmission.

b. The following examples illustrate how you can relate the signs of inflammation to the symptoms produced by specific infections:

	Conjunctivitis	*Appendicitis*
Redness	of the inner eyelid and the eyeball	of the appendix, the end of the cecum (internal sign)
Heat	local warmth, slight temperature elevation	local warmth, temperature of 100-102°F, 37.7-38.8°C
Swelling	mild to moderate puffiness of lids	internally, moderate enlargement of appendix and neighboring structures
Pain	mild to moderate, sensitivity to light	moderate to severe over abdomen
Loss of function	difficulty in keeping eyelids open, vision impaired	loss of appetite, nausea, vomiting, decreased digestive action

c. The acute phase of an infection is characterized by a sudden onset of symptoms, as well as by the vascular changes of inflammation, especially swelling caused by fluid collecting in tissue. The acute phase is followed by an increase in white blood cells to overcome the infection and to clear away the damaged tissues so that healing can occur.

what has not been rendered sterile. The covers and packages usually look the same before and after being sterilized, so you must keep them separate and rely on the use of indicators such as chemical tablets or tapes that turn color when sterilized. Sterile supplies in metal canisters or cloth-wrapped packages have a limited shelf life and must be resterilized periodically.

d. Remedy Contamination Immediately. Contamination occurs when a sterile surface comes in contact with any unsterile surface, whether solid, liquid, or gas. This can occur when you or others move too quickly and accidentally touch a sterile object with an unsterile one. The resulting contamination can be remedied by:

(1) Promptly removing the contaminated object(s) from the area.

(2) Covering the contaminated object(s) with a sterile towel or drape.

(3) Discarding the contaminated object(s) and starting over if the sterile field and the set-up (items required to carry out a sterile procedure) have also been contaminated.

14-30. Principles of Aseptic Surgical Technique

a. The following principles form the basis for surgical asepsis:

(1) Sterile surface touching sterile surface remains sterile.

(2) Sterile surface touching unsterile surface becomes contaminated.

(3) Sterile materials must be kept dry; moisture transmits microorganisms and contaminates.

(4) When there is doubt about the sterility of any item, it must be considered *not* sterile.

(5) Reaching across or above a sterile field with bare hands or arms or with other nonsterile items must be avoided.

(6) Coughing, sneezing, or unnecessary talking near or over a sterile field must be avoided.

(7) When wearing sterile gloves, hands must be kept in sight, away from all unsterile objects and above waist level.

(8) The wrapper of a sterile pack must be opened away from the body, the distal flap first, the lateral flaps next, and the proximal flap toward the body last, thus making it unnecessary to reach over the sterile field.

(9) The sterile zone is confined to the table top or to above waist level. Anything that hangs, falls, or touches below these levels is considered contaminated.

(10) An area of one inch surrounding the outer edge of the sterile field must be considered unsterile.

d. A bacterial infection of the skin or mucous membrane frequently causes fluid drainage from the wound or broken-down tissue. You must assess this drainage: its color, consistency, odor (if any), and amount. The color ranges from creamy yellow to dark green. Because purulent drainage contains dead phagocytes, bacteria, and tissue, it is thick in consistency. As the infection clears, the drainage has less odor, becomes more serous or watery, decreases in amount, and the color lightens. Signs of inflammation subside as healing occurs.

14-29. Rules for Asepsis

Sterility is the absence of microorganisms. Sterilization can be accomplished by different methods, such as boiling, dry heat, various chemicals, autoclaving (steam under pressure), and gases, such as ethylene oxide. There are four primary rules of asepsis—

a. Know What is Sterile. Most health care facilities now use commercially prepackaged sterile kits, packs, and supplies. These materials are disposable and can be discarded after use. When using these sterile supplies, you must inspect the outer layer or wrapping to insure that it is intact, without visible holes, tears, or damage. Paper and plastic materials are used for wrapping, which must be impervious to dust and resistant to moisture. These precautions are necessary because microorganisms are carried on dust particles and microscopic droplets of moisture. Some health care facilities find it more feasible to prepare their own sterile supplies. Standardized procedures should be followed to clean, assemble, wrap, label, and sterilize the instruments, linens, supplies, and other items.

b. Know What is Not Sterile. Some things cannot be sterilized and rendered free of microorganisms, most notable, human skin and mucous membranes. From a practical point of view, it would be difficult to sterilize furniture, complex equipment or machinery, and even such things as the air supply in a room. However, items that cannot be sterilized must be cleaned thoroughly and disinfected as much as possible. It is important to avoid creating air currents near a sterile field by shaking linen, coughing, sneezing, or talking unnecessarily. Even when using sterile items, you must be aware of what is not sterile. Microorganisms cling to all surfaces, whether solid, liquid, or gaseous in nature. When any sterile surface touches a nonsterile surface, it is no longer sterile. The outer wrapping of a sterile package or kit is unsterile, as is the outside of glass vials and ampules containing medications. The outer one-inch edge of any sterile field is also considered unsterile because airborne microorganisms may have settled on it. Any portion of a sterile drape or equipment that hangs below a table top or waist level is considered unsterile. Outdated autoclaved canisters as well as cloth- or paper-wrapped items and sterile items left exposed to the air and unattended even briefly are likewise regarded as nonsterile.

c. Separate Sterile From Unsterile. The use of commercially prepared sterile disposables has reduced the need to store sterile items separately. The sterile packages are individually labeled and wrapped to allow inspection for intactness. When kept on clean dry shelves, they will remain sterile for an indefinite time. However, hospitals that sterilize their own metal canisters and cloth- or paper-wrapped packs should store sterilized items separately from unsterile materials as there is no way to visually recognize what has and

what has not been rendered sterile. The covers and packages usually look the same before and after being sterilized, so you must keep them separate and rely on the use of indicators such as chemical tablets or tapes that turn color when sterilized. Sterile supplies in metal canisters or cloth-wrapped packages have a limited shelf life and must be resterilized periodically.

d. Remedy Contamination Immediately. Contamination occurs when a sterile surface comes in contact with any unsterile surface, whether solid, liquid, or gas. This can occur when you or others move too quickly and accidentally touch a sterile object with an unsterile one. The resulting contamination can be remedied by:

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(2) Covering the contaminated object(s) with a sterile towel or drape.

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(6) Coughing, sneezing, or unnecessary talking near or over a sterile field must be avoided.

(7) When wearing sterile gloves, hands must be kept in sight, away from all unsterile objects and above waist level.

(8) The wrapper of a sterile pack must be opened away from the body, the distal flap first, the lateral flaps next, and the proximal flap toward the body last, thus making it unnecessary to reach over the sterile field.

(9) The sterile zone is confined to the table top or to above waist level. Anything that hangs, falls, or touches below these levels is considered contaminated.

(10) An area of one inch surrounding the outer edge of the sterile field must be considered unsterile.

(11) The sterile field must be kept in sight at all times. Do not turn your back on it or leave it.

(12) The floor must be recognized as the most grossly contaminated area. Clean or sterile items that fall on the floor should be discarded or decontaminated.

b. Many activities and skills are based on practice of the principles of medical and surgical asepsis. In medical asepsis, the goal is to keep the organisms within a given area; in surgical asepsis, the area must be kept free from organisms. These concepts are equally important. Table 14-2 presents a comparison of factors in medical and surgical asepsis.

Table 14-2. Comparison Factors in Medical and Surgical Asepsis.

Factor	Medical Asepsis	Surgical Asepsis
Patient	Has infection, lowered resistance to other infections.	Potential host. Lowered resistance makes more susceptible.
Reservoir of infection	The patient—organisms spread by direct and indirect contact.	Organisms harbored by others and in the environment.
Location of barriers	Confine organisms within room, unit, or locale.	Prevent organisms from reaching patient or area.
Equipment and supplies	Disinfect, sterilize, or dispose of after contact with patient	Disinfect or sterilize before contact with patient.
Protective clothing: gown, gloves, masks	Clean items to protect worker from organisms. Discard after contact with patient	Sterile items (except masks) to protect patient. Remedy if contaminated.
Goal of actions	CONFINE ORGANISMS and prevent spread of infection to others.	REDUCE NUMBER OF ORGANISMS and prevent spread of infection to patient.

14-31. Use of Disinfectants and Antiseptics

a. Disinfectants are agents that destroy pathogenic organisms. Although the action of sunlight and heat is included in this category, medically the term applies to chemical agents that kill pathogens outside of the body. Disinfectants are used on objects such as equipment, furniture, walls, and floors; however, most of these chemicals are too harsh to use on living tissue.

b. Antiseptic agents inhibit the growth of organisms. While antiseptics also include disinfectants, antiseptics can be used on body tissue. They can be used to treat wounds, to prepare the skin for operation, and to reduce organisms on the skin. Disinfectants and antiseptics chosen for use in hospitals should meet the following criteria:

- Inhibit or kill the pathogens within a reasonable period of time.
- Not be harmful to materials or surfaces.
- Not be readily neutralized by soaps, detergents, or proteins.
- Be stable in solution.

Among the types of disinfectants and antiseptics frequently employed are the following: cyanide; phenolics; such as Staphene and Vas-phene; iodine and iodophors, such as povidone-iodine to destroy bacteria, viruses, and fungi; alcohol, to inhibit and destroy organisms; and chloride compounds, generally intended for use on floor surfaces.

14-32. Handwashing

All personnel and patients, regardless of position or diagnosis, should be recognized as potential carriers of pathogenic organisms. One of the most critical tasks in medical care duties is that of providing a safe atmosphere for you as well as for the patient. Because your hands carry millions of germs, frequent handwashing is one of the simplest techniques to help prevent the spread of disease and infection. This procedure is designed for use between *routine* patients when providing care. The entire procedure can be done effectively in about 2 minutes.

14-33. Types of Soaps

Soap combines with foreign matter on the skin and lowers the surface tension (clinging effects) of grease and dirt, thus permitting them to be easily removed from the skin surfaces. There are various types of soaps currently in use:

a. Antimicrobial—a disinfectant, germicidal, and fungicidal concentrate (Wescodyne/Betadine). This is a general-purpose germicide, suitable for hand cleansing as well as for disinfecting various types of equipment and instruments. This concentrate must be diluted with water to make at least a 75 parts-per-million (ppm) or higher solution. The clear, dark amber color of this solution is an indication of its germicidal effectiveness; when the color fades, a fresh solution must be prepared.

b. Liquid soap—a bacteria-inhibiting (bacteriostatic) liquid soap may be used for handwashing and disinfecting skin surfaces. The active ingredient in these types of soaps is hexachlorophene, which has a cumulative effect in reducing bacteria on the skin.

c. Soap bars—is the least effective method. The bar of soap can be a germ-carrier itself when contaminated by dirty water. Care must be taken to rinse the soap well before returning it to the soap dish. This reduces the chance of contaminating the soap.

14-34. Handwashing Procedure

Proper handwashing consists of three essential elements: soap, friction, and running water. In a field situation, you will rarely have a sink with faucets at your disposal. Therefore, you may use other methods for handwashing.

a. Equipment (two-basin method).

(1) Two basins.

(2) Canteen of water.

(3) Soap (bacteriostatic or Wescodyne, if possible).

(4) Paper towels.

(5) Assistant (to pour the rinse water).

b. Fill basin and canteen. Fill basin with just enough water to wash hands. Fill canteen with water for rinsing.

NOTE

Potable water should be used from a reliable source (Lyster bag, water pod, and so forth).

c. If Wescodyne/Betadine soap is to be used, mix the solution to prescribed strength (at least 75 ppm).

d. Remove jewelry. Jewelry should not be worn when performing patient care because microorganisms become lodged in the settings or stones or rings. The only exception is a plain wedding band. Fingernails should be kept clean and short.

e. Roll sleeves above elbows.

f. Wash both hands and forearms from fingertips to elbow.

(1) Wet hands, wrists, and forearms.

(2) Apply soap.

(3) Using firm circular movements,wash fingers, finger webbing, and fingernails first.

(4) Wash palms and back of hands second.

(5) Wash forearms to elbows last.

NOTE

Give particular attention to creases and folds in the skin when washing; these areas harbor many microorganisms.

g. Rinse hands and forearms from fingertips to elbows.

(1) Use canteen of water for rinse.

(2) Have assistant pour rinse water over soapy areas into the empty basin. He should not touch lip of canteen to skin as this would contaminate that area.

NOTE

If no assistant is available, you may pour the rinse water by holding the canteen with clean paper towels in your free hand.

(3) Hold hands slightly higher than elbows to prevent recontaminating hands and fingers.

h. Dry hands.

(1) Use clean paper towels for each hand. If not available and cloth towel is to be used, use opposite end for each hand.

(2) Dry thoroughly from fingertips toward elbow. *Do not* go back up toward fingertips as this would recontaminate the area.

i. Dispose of all dirty material in accordance with local policy. There are other methods and devices for washing hands in field conditions. These methods and devices are described in FM 21-10.

14-35. Opening Sterile Packs and Sets

a. Sterile materials and supplies are usually prepared commercially and are disposable for one-time use items. The packages, sets, or kits provide all of the items commonly required in medical procedures such as catheterization, suture removal, dressing change, irrigation, enema, and catheter care. Individually wrapped items can be obtained to supplement the packs as needed. The package or set is opened by removing the outer plastic or paper covering, taking out the inner package, and unfolding the wrapper to form a sterile field from which to work. The principles of asepsis apply regardless of whether the package is a disposable or a wrapped tray prepared by a hospital department. The principles to observe when opening sterile packages are—

- Wash your hands.
- Open sterile packages *away* from the body.
- Touch only the outside of the wrapper.
- Do not reach across a sterile field.
- Always face the sterile field; go around the sterile field, if necessary.

- Allow sufficient space (at least 12 inches) between your body and the sterile field.

b. Procedure for opening sterile packs.

(1) Obtain the sterile package containing the required item(s) (Figure 14-17A). The item should be placed on a table or flat surface while being unwrapped. Disposable packages have a plastic or paper covering. Hospital-prepared goods have cloth or paper covers and you must check package indicator for date and sterility of the package. Chemically treated indicators change color when sterilized. Heat-sensitive tape used at the external opening of packaged material will show distinctive diagonal stripes following exposure to a heat sterilization process.

(2) Remove the plastic covering and external wrap from the package. Remove the contents so as to avoid contaminating them. Touch only the outer surface of the wrapped contents.

(3) Open the wrapper (Figure 14-17B). Remove outside fastening. With one hand, lift the distal flap up and toward the back, away from the package. Let the distal flap drop gently over the back of the table. It is important to open the distal flap first so that your unsterile arm *does not* reach across the sterile contents.

(4) Open left and right flaps (Figures 14-17C and 14-17D). With your left hand, move the flap up and laterally away from the package.

(5) Open the proximal flap (Figure 14-17C). Lift the flap up and toward you, dropping it gently over the front of the table or your hand. Once the wrapper of the package has been opened, it should not be folded closed again. The contents should be used as soon as possible. Avoid contaminating the articles in the package by using sterile gloves or forceps when handling them.

14-36. Opening Individually Wrapped Supplies

Almost every sterile item you use is available as an individually wrapped or separate item, such as sterile packages of applicators, tongue blades, 4 x 4 gauze dressings, Vaseline dressings, ABD dressings, syringe, Foley catheters, and tube coverings or caps. Instructions usually appear telling where to open or indicating the direction in which to tear or peel at a certain point. When opening the package follow these instructions to avoid contaminating the contents (Figures 14-18A and 14-18B).

a. Grasp the package by the slightly extended edges provided. Bring both your hands together and grasp the edges of the package.

b. Peel along the sealed edge. Turn your hands outward to separate the sealed, sterile package. Peel in a downward motion. Do not touch the inside of the wrapper.

c. Place the package on a flat surface , OR

d. Hand the article to a sterile person , OR

e. Lift the sterile item from the wrapper by using sterile forceps (Figure 14-18). The inside area of the wrapper is sterile and may serve as a sterile field until the contents are used. Keep your fingers away from the edges. The sterile person then picks up the sterile item.

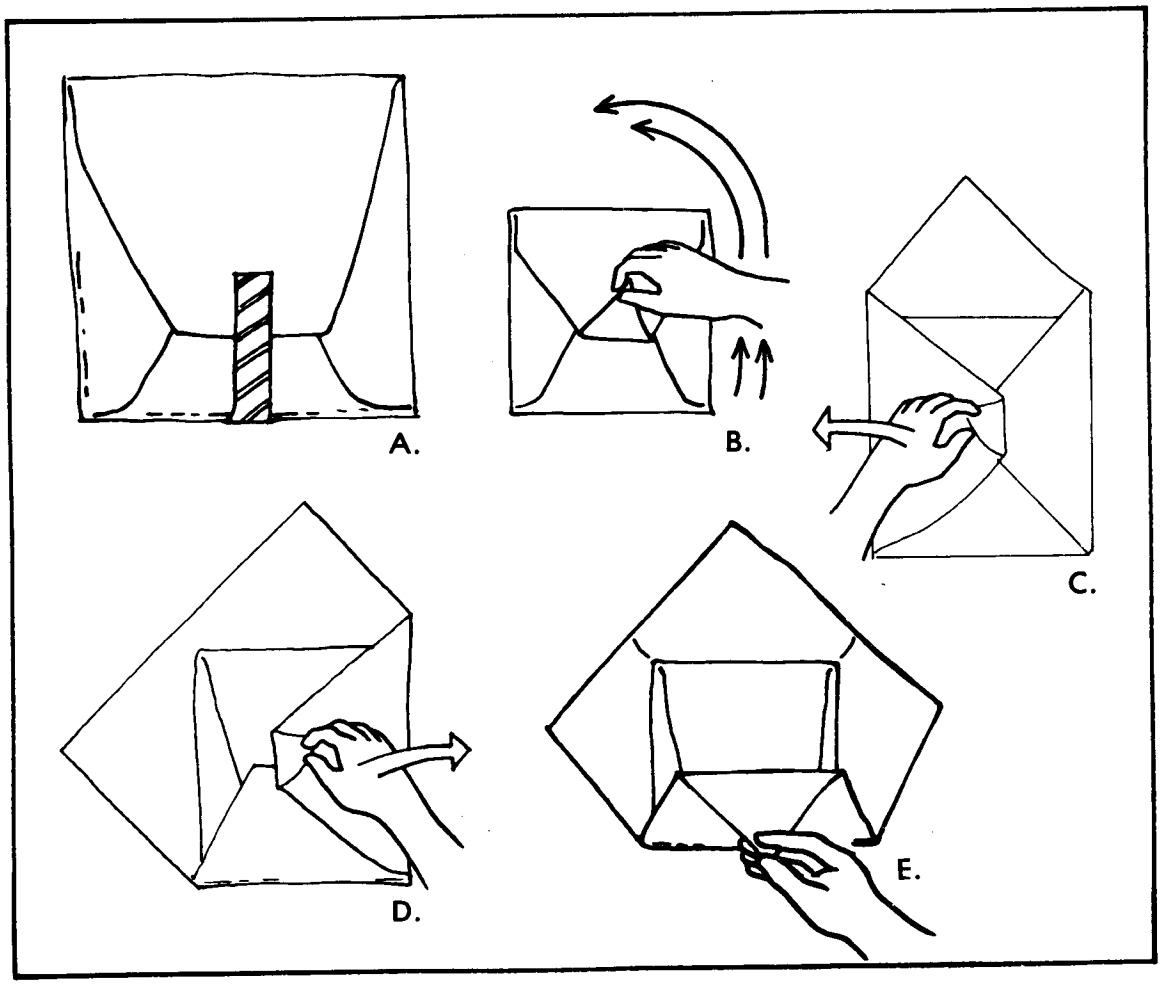

Figure 14-17. Opening sterile packs.

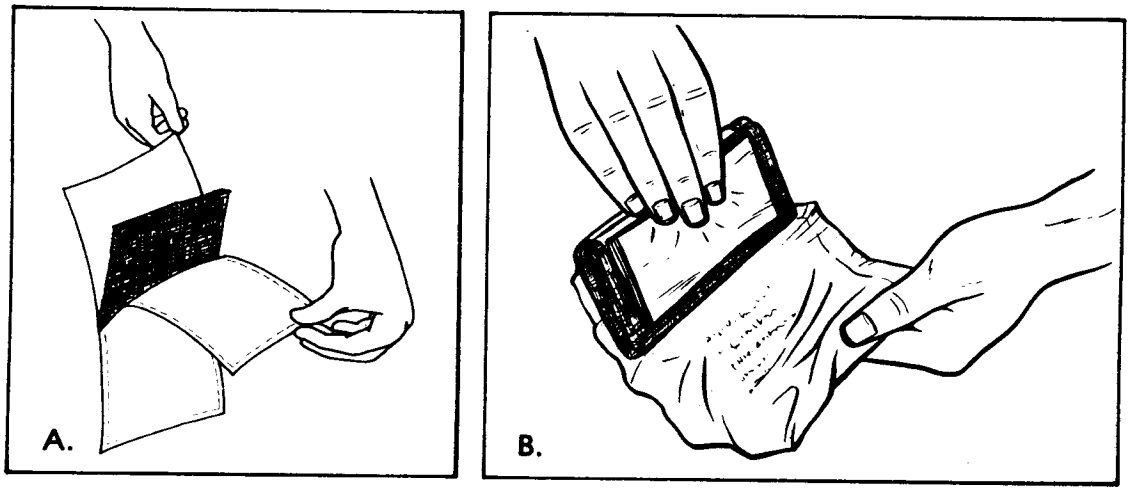

Figure 14-18. Opening individually wrapped supplies.

14-37. Donning and Removing Sterile Gloves

The following procedure should be used when donning and removing sterile gloves:

a. Obtain package containing correct size gloves.

b. Inspect the package for any signs of possible contamination (water spots, moisture, or tears in the package). If package appears contaminated, discard and select another package.

c. Perform patient care handwash.

d. Place package on clean, dry surface and peel back outer wrapper completely to expose the inner package.

e. Remove the inner package and place it so that the end of the package nearest you indicates the printed word "cuff."

f. Unfold the package by grasping the lower corner and opening the package to a fully flat position (Figure 14-19). Do not touch gloves. Gloves should be positioned with right hand in line with your right hand, and left hand in line with your left hand.

g. Grasp lower corners, or area designated in folder, and pull to side gently, without touching or contaminating gloves.

h. Grasp the cuff of one glove at the folded edge and remove from wrapper with one hand (Figure 14-20).

i. Step back from the table or tray.

j. While keeping hands above your waist, insert fingers of your other hand into the glove and pull on by only touching the cuff (Figure 14-21).

k. Pick up the second glove by inserting the tips of fingers of gloved hand under the folded cuff (Figure 14-22).

l. Insert fingers of ungloved hand into glove and pull up without contaminating either glove (Figure 14-23).

NOTE

Touch glove to glove and skin to skin to maintain sterility.

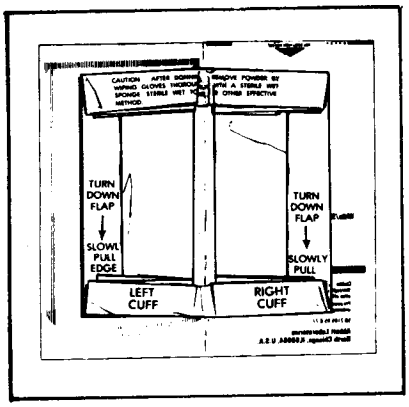

Figure 14-19. Package in fully flat position.

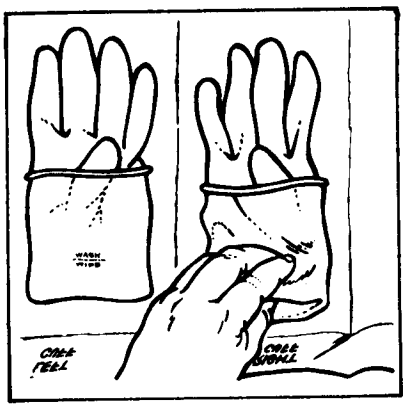

Figure 14-20. Remove from wrapper.

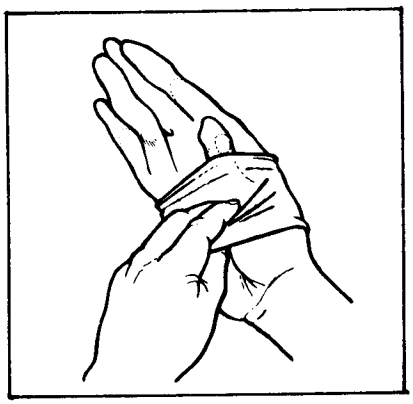

Figure 14-21. Insert fingers of other hand.

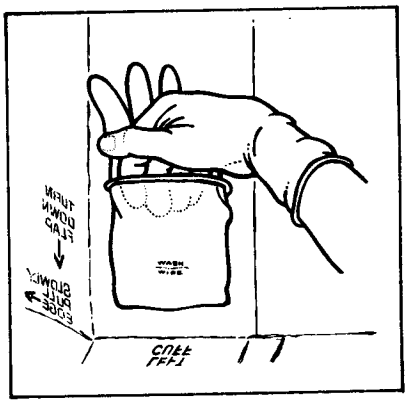

Figure 14-22. Pick up second glove.

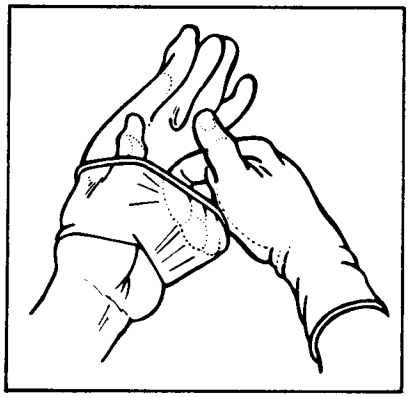

Figure 14-23. Insert fingers of ungloved hand into glove.

m. Adjust the gloves to fit firmly and comfortably without contaminating (either pull on individual fingers or interlock gloved fingers).

n. To remove gloves, begin by grasping the glove at the heel of the hand with the other gloved hand.

o. Peel off glove, retaining removed glove in palm of remaining gloved hand.

p. Insert one or two fingers of ungloved hand under the glove of the remaining gloved hand. Peel glove off hand without contaminating self.

NOTE

Remember to remove gloves "glove to glove" and "skin to skin."

q. Discard gloves according to local SOP.

r. Wash hands.

14-38. Assessment of Wounds

a. Assessment of the patient must include a complete inspection of all skin areas. Every abrasion, laceration, contusion, reddened pressure area, ecchymosis, and incision is noted. Be alert for signs of inflammation: redness, swelling, pain, heat, and loss of function. The location and the appearance of these skin wounds is charted each day in specific terms, since changes can occur quite rapidly. Assessment of wounds requires notations about the dressing even when the wound cannot be observed directly. After a traumatic injury or surgery, the initial dressing remains in place until the physician changes it or authorizes you to do so. The appearance of the dressing provides some information about the wound underneath. Dressings are kept as dry as possible to reduce capillary attraction of microorganisms and potential infection. Excessive drainage or increased bleeding should be reported to the physician.

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b. An early sign of impaired healing is evidenced by hemorrhage, visible bleeding, or symptoms of concealed internal bleeding. When this occurs, the dressings on surgical incisions or wounds must be inspected; also look at the area under the patient because blood from wounds can leak out and form pools. Observe drainage tubes frequently for signs of bleeding. Monitor the patient's vital signs until his condition is stable. Improper healing can result in—

- An *abscess,* a localized infection in which there is an accumulation of pus. The liquid may be white, yellow, pink, or green, depending on the infecting microorganism.
- *Cellulitis,* an inflammation of the cellular tissue surrounding the initial wound.
- *Empyema,* the collection of pus in an already existing cavity, such as the gallbladder or lung.
- A *fistula,* an abnormal passage or communication usually formed between two internal organs, or leading from an internal organ to the surface of the body. A fistula may result from an infection. Common postoperative fistulas are designated according to the organs or parts with which they communicate, such as rectovaginal, fecal, anal, biliary, and the like.
- A *sinus,* a canal or passageway leading to an abscess.

14-39. Dry, Sterile Wound Dressing

a. A dressing is any sterile material used to cover a wound. The sterile dressing—

- Protects the wound from bacteria.
- Protects the environment from bacteria in the wound.
- Absorbs drainage.

b. A well-applied dressing makes the patient feel like he is getting good health care. Psychologically, this makes the patient feel better.

14-40. Requirement to Change or Reinforce a Dressing

a. The physician or the supervisor orders tells you when to apply a dressing and how often to change the dressing. This order also specifies if the wound is to be cleansed.

b. Under field conditions, you will not change the dressing without a physician's order. Reinforce the dressing and place the date, time, and your initials on the dressing.

c. Sometimes a dressing may need to be changed because it is soaked with seepage. If the circumstances or the physician's or the supervisor's order prohibit the change, reinforce the area by covering it with another dressing. Label it "reinforcement," and write the date, time, and your initials on it.

14-41. Dressing Materials

Various types of dressing materials are used when applying or changing a dressing. The following are those most frequently used:

a. Coarse mesh gauze sponge (Figure 14-24A).

(1) Available in several sizes, but the ones used routinely are 2 x 2 in (5.08 x 5.08 cm), 4 x 4 in (10.16 x 10.16 cm), and 4 x 8 in (10.16 x 20.32 cm).

(2) Commonly used as intermediate layers in many dressings.

b. ABD Pad (abdominal pad, combines) (Figure 14-24B).

(1) Large, thick, multilayered absorbent dressing.

(2) Used primarily for postoperative abdominal incisions.

c. Telfa pad (Figure 14-24C).

(1) Pad with a plastic-like coating on one side of gauze dressing.

(2) Used to prevent the dressing from sticking to the wound.

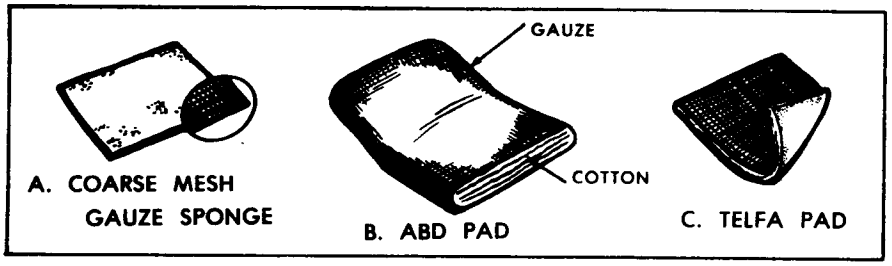

Figure 14-24. Dressing materials.

d. Petrolatum (Vaseline) gauze (Figure 14-25A).

(1) Consists of gauze coated with petroleum jelly.

(2) Used to protect tissue from drying, to prevent adherence to the wound, and to create an airtight seal.

e. Roller gauze bandage (Figure 14-25B). A loose mesh material available in various sizes from 1 to 4 in (2.54 to 10.16 cm) wide and 5 yd (4.57 m) long.

f. Kling and Kerlix bandage (Figure 14-25C).

(1) Loosely woven or knitted roller gauze bandages which are soft and conform easily.

(2) Used most often to secure dressings, are highly absorptive, and are appropriate when a bulky dressing is needed.

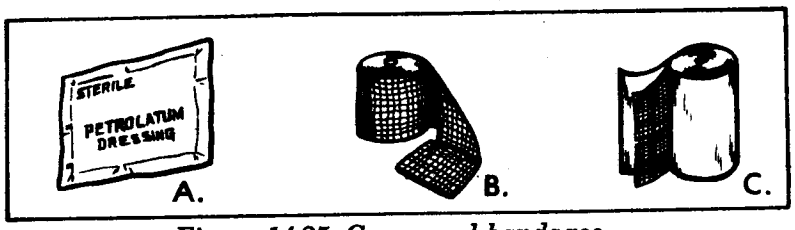

Figure 14-25. Gauze and bandages.

14-42. Tapes

The following tapes are used to secure dressings:

a. Adhesive.

(1) Made from cotton, cloth, paper, or foam.

(2) Available in several widths.

(3) In addition to being used to secure dressings, the adhesive tapes are used to secure splints, to strap joints to prevent or treat athletic injuries, and to immobilize various parts of the body.

b. Hypoallergenic.

(1) Made from paper.

(2) Porous—allows air exchange.

c. Plastic.

(1) Transparent.

(2) Porous—allows air exchange.

14-43. Procedure for Changing a Sterile Dressing

a. Identify the patient and provide privacy. Provide privacy if possible by placing a screen or curtain around the patient or by closing the door.

b. Explain the procedure. Gain the patient's confidence and cooperation by telling him why you are changing the dressing and what the procedure will be.

c. Perform patient care handwash.

d. Obtain necessary equipment and supplies.

(1) Dressings—4 x 4 in (10.16 x 10.16 cm) and 4 x 8 in (10.16 x 20.32 cm) sponges.

(2) Gauze pads or cotton-tipped applicators.

(3) Gloves.

(4) Scissors.

(5) Solution basin, if applicable.

(6) Sterile towels (for sterile field).

(7) Tape.

(8) Adhesive solvent.

(9) Container for adhesive solvent.

(10) Drain, if applicable.

(11) Disinfecting solution, if applicable.

(12) Sterile forceps.

e. Prepare the patient. Position the patient.

(1) Make the wound site easily accessible.

(2) Expose the wound.

(a) Remove the patient's clothing. Do not expose any more of the patient's body than is necessary.

(b) Fold the bed linens or pajamas away from the wound area.

f. Prepare the work area.

(1) Clear all items off the bedside stand.

(2) Clean and dry area.

(3) Cut the tape strips to the size that is required to secure the dressing.

(4) Attach one end of each tape strip to an area that can be easily reached.

(5) Pour adhesive solvent into the solvent basin.

(6) Pour the disinfecting solution into a solution basin.

g. Prepare sterile field, equipment, and supplies.

h. Remove soiled dressing from wound (Figure 14-26).

CAUTION

Do not put pressure on the wound. This will cause unnecessary pain, possible additional injury, and interfere with the healing process.

(1) Loosen the ends of the tape attached to the patient's skin.

(2) Peel ends toward the wound while holding the skin with the other hand.

(3) Do not remove tape away from the wound. Doing this will—

(a) Create tension on the wound.

(b) Disrupt the scab.

(c) Tear the skin.

(4) Note any abnormal seepage.

(5) Put on sterile gloves.

(6) Grasp the edge of the dressing with sterile forceps and gently roll the dressing off the wound. If the dressing sticks to the wound, moisten the dressing with sterile water to soften the surface of the wound.

(7) Throw away dressing in a contaminated waste container.

(8) Do not touch the contaminated side of dressing to you or to any surface.

i. Remove the adhesive from around the wound.

(1) Gently rub a solvent-soaked cotton-tipped applicator or gauze pad over the adhesive (Figure 14-26). Removing the adhesive when a dressing is changed reduces the potential for skin irritation.

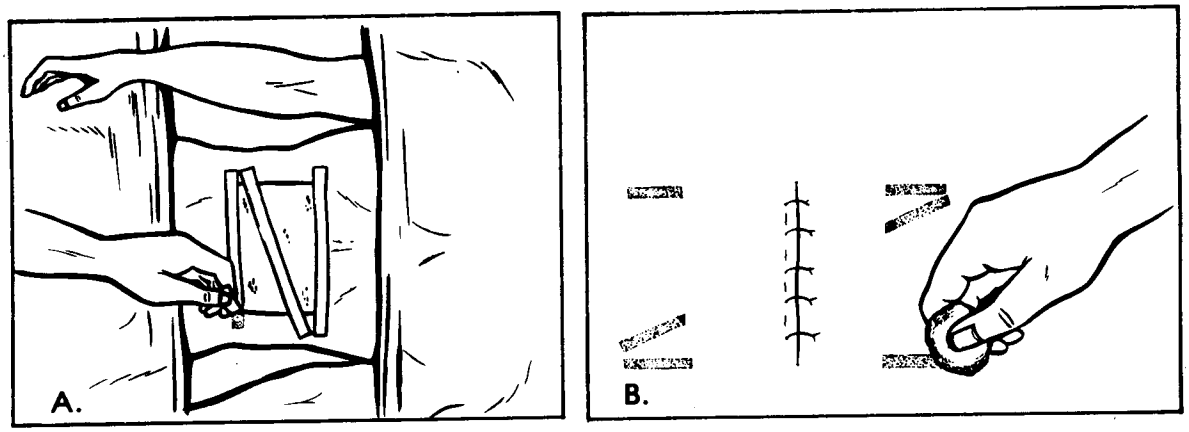

Figure 14-26. Removing sealed dressing and adhesive from around wound.

(2) Observe skin for signs of irritation (redness, rash, or swelling).

j. Inspect the wound. Look for signs of:

(1) Infection.

(2) Redness.

(3) Swelling.

(4) Pus (usually yellow fluid; may be blood tinged, greenish, or brown).

(5) Putrid (bad) odor.

(6) Color.

(7) Condition of suture (joining of wound edges).

(8) Condition of drains.

(9) Healing.

k. Cleanse the wound if order indicates. Dip the cotton swab into a cleaning or disinfecting solution.

(1) Cleansing a linear wound (Figure 14-27).

(a) Stroke 1. Swab the area directly over the wound. Discard the swab.

(b) Stroke 2. On the patient's right side, swab the area next to the wound. Discard the swab.

(c) Stroke 3. On the patient's left side, swab the area next to the wound. Discard the swab.

(d) Stroke 4. On the patient's right side, swab the area next to the second stroke. Discard the swab.

(e) Stroke 5. On the patient's left side, swab the area next to the third stroke. Discard the swab.

(2) Cleansing a circular wound (Figure 14-27).

(a) Stroke 1. Starting at the center of the wound, swab the area in an outward circular spiral.

(b) Stroke 2. Swab the area next to the wound in an outward circular spiral pattern for two revolutions. Discard the swab.

(c) Stroke 3. From the spot where the first stroke ended, continue swabbing in an outward circular pattern for two revolutions. Discard the swab.

(d) Stroke 4. From the spot where the third stroke ended, continue swabing in an outward circular pattern for two revolutions. Discard the swab.

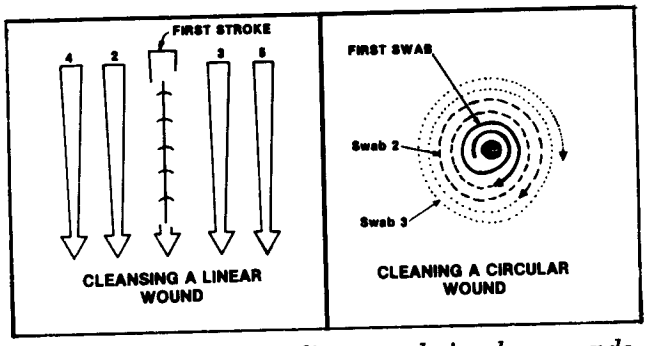

Figure 14-27. Cleansing linear and circular wounds.

l. Apply a sterile dressing (Figure 14-28). Cover the wound with a sterile dressing.

(1) Lay a dressing over the wound.

(2) Overlap the first dressing with a second dressing.

(3) Overlap the second dressing with a third dressing.

(4) Completely overlap all the dressings with a large dressing.

NOTE

If a drain is in place, cut one of the dressing squares halfway through with sterile scissors, and position it around the drain.

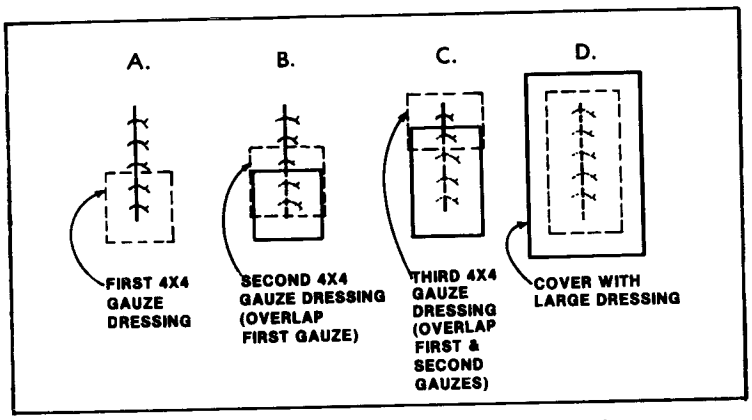

Figure 14-28. Applying a sterile dressing.

(5) Remove sterile gloves.

(6) Secure the dressing in place with tape.

(7) Write the date and time the dressing was changed on the tape and initial it.

m. Remove/discard contaminated materials.

n. Perform patient care handwash.

o. Report and record procedure.

(1) Tell the supervisor that the dressing has been changed. Report any observations made during the procedure.

(2) Record the following data:

(a) Date of dressing change.

(b) Time of dressing change.

(c) Appearance of wound before cleansing.

(d) Appearance of wound after cleansing.

(e) Amount of drainage.

(f) Characteristics of wound and drainage.

Section IV. OBTAIN A BLOOD SPECIMEN

14-44. General

a. Venipuncture is the act of puncturing a vein with a needle to—

(1) Obtain a blood specimen for laboratory tests.

(2) Inject medications or intravenous solutions.

b. Venipuncture can be done by using either a needle and syringe or by using the Vacutainer system.

14-45. The Vacutainer System

a. The Vacutainer system (Figure 14-29) is a type of syringe that consists of—

(1) A vacuum tube with a rubber stopper.

(2) A double-pointed needle. Two types of needles can be used:

(a) Single draw needles for single blood specimens.

(b) Multiple draw needles for multiple blood specimens. The shaft of the multiple draw needle is covered with a rubber sheath. The sheath slips back over the needle when the needle enters the stoppered vacuum tube to prevent blood from dripping into the holder.

(3) A plastic holder with a guideline. The needle is supplied in a sterile package. (The needle that is inserted in the vein *must be sterile.)*

b. The Vacutainer system provides a fast and easy way of collecting several blood specimens with only one needle puncture. However, this system has some drawbacks:

(1) It *cannot* be used when *sterile blood specimens* are needed for bacteriologic studies or cultures.

(2) It is impossible to draw back on the plunger to determine if the needle is in the vein.

(3) The suction of the vacuum in the tube can sometimes collapse the vein.

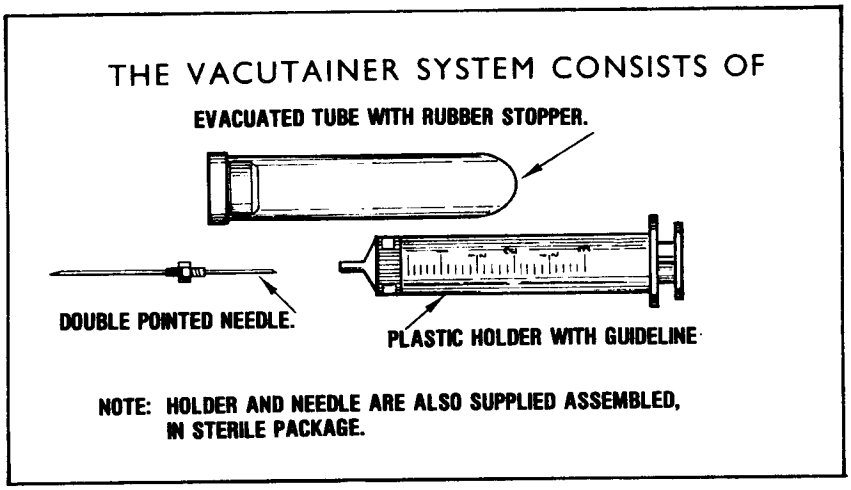

Figure 14-29. Vacutainer system.

14-46. Procedure for Obtaining a Blood Specimen Using the Vacutainer System

a. Obtain the necessary equipment and supplies.

(1) Blood specimen collection vacuum tubes. (Verify what type of tube is to be used. For some tests, an anticoagulant is used in the tubes to prevent clotting. In some laboratories, color coding is used on tubes for different tests.)

(2) Constricting band (flexible latex band or commercial band).

(3) Vacutainer system (plastic holder and single or multiple draw needle).

(4) Betadine or alcohol swab (prepackaged). (Betadine is preferred because it is more effective in reducing the number of skin pathogens.)

(5) Protective pad.

(6) Sterile 2 inch by 2 inch gauze sponge.

(7) Plastic strip.

(8) Rubber band.

(9) Gum-backed labels.

b. Label specimen tube.

(1) Write patient's name, hospitalization and social security numbers, prefix code, ward or clinic designation, name of facility, and date.

(2) Apply label to specimen tube.

c. Perform patient care handwash.

d. Assemble Vacutainer holder and needle without contaminating sterile parts.

(1) Put short end of needle into threaded end of holder.

(2) Attach firmly using a clockwise motion.

(3) Remove needle cover and inspect needle for burs, barbs, or discoloration. (Needle should have glossy, stainless appearance.)

e. Insert blood specimen tube into Vacutainer holder.

(1) Insert rubber-stoppered end of vacuum tube into holder.

(2) Advance until leading edge of stopper meets guideline on holder.

f. Identify the patient.

(1) *Inpatient:* Ask the patient his name, and compare name to bed card and Identaband.

(2) *Outpatient:* Ask the patient his name, and compare it to the medical records or laboratory request.

g. Position the patient. Assist the patient into a comfortable sitting or lying position—never standing.

h. Expose arm for venipuncture.

(1) Roll the sleeve well above the elbow area.

(2) Extend the patient's arm with his palm up. Support the arm by using a pillow, table, or other flat surface.

i. Select vein for venipuncture. Palpate and select one of the most prominent veins (Figure 14-30) in the antecubital fossa (hollow or depressed area in the joint between arm and forearm).

(1) *First choice:* The median cubital vein is—

- Usually visible.
- Large and palpable.
- Well supported.
- The least likely to roll.

(2) *Second choice:* The cephalic vein.

(3) *Third choice:* The basilic vein is—

- Usually the most prominent vein.
- Least desirable. Vein tends to roll, making venipuncture difficult.

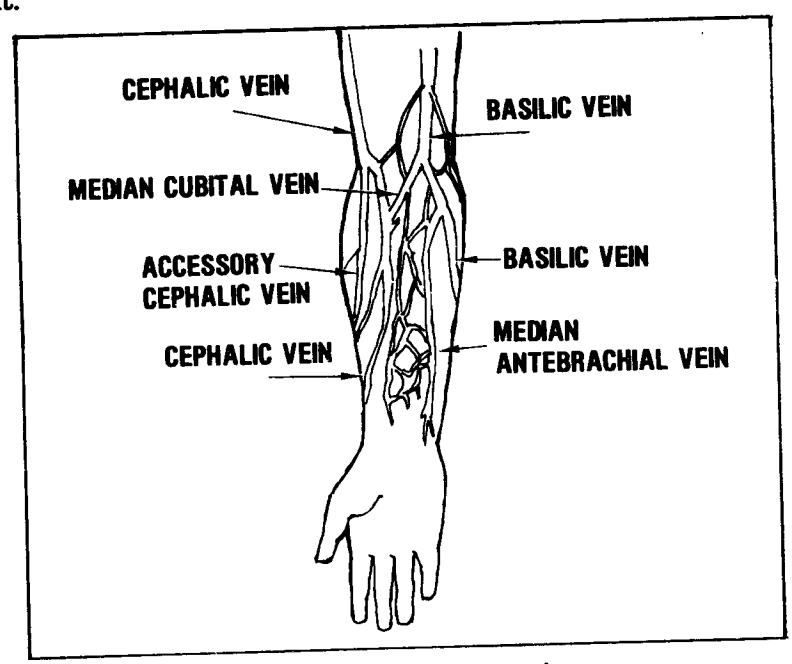

Figure 14-30. Prominent veins.

j. Prepare sponge for use.

(1) Open the Betadine or alcohol swab and the 2 inch by 2 inch sponge. Do not remove them from the packages until they are ready to be used.

(2) Place packages within easy reach.

k. Apply constricting band.

(1) *Latex tubing (Figure 14-31).*

(a) Wrap the tubing around the limb about 2 inches above venipuncture site. Use sufficient pressure to stop venous return without stopping arterial flow. (You should be able to feel a radial pulse.)

(b) Hold one end of tube so that it is longer than the other end.

(c) Form a loop with the longer end. Pass this loop under the shorter end so that the tails of the tubing are turned away from proposed site of injection.

(d) Instruct the patient to open and close his fist several times and to hold his clenched fist to trap blood in veins. This causes the veins to distend. If the vein of choice does not distend, gently tapping the venipuncture site may help distension.

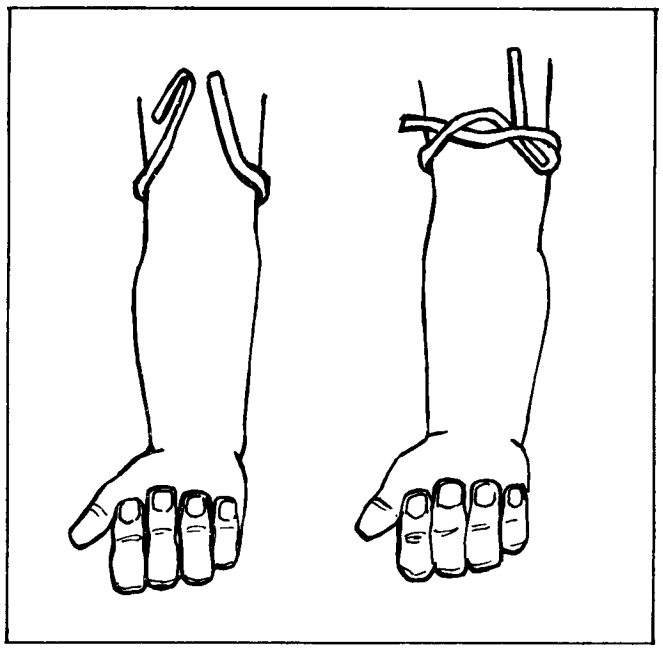

Figure 14-31. Constricting bands.

(2) *Commercial constricting band.*

(a) Follow step 14-46*k*(1)*(a)* above.

(b) Secure the band by overlapping Velcro ends.

(c) Follow step 14-46 *k*(1)*(d)* above.

l. Palpate selected vein. Palpate distended vein lightly with your index finger (Figure 14-32). Move the finger an inch or two in either direction to determine the size and direction of the vein.

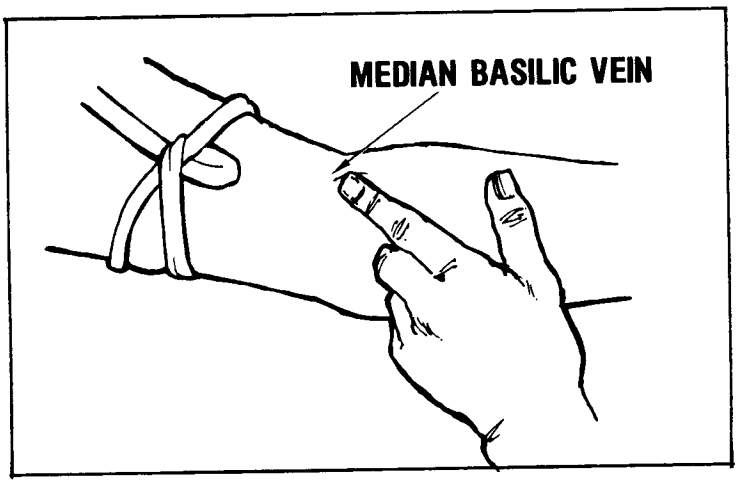

Figure 14-32. Palpate the distended vein.

m. Cleanse the skin.

(1) Cleanse skin over selected area with the Betadine or alcohol swab (Figure 14-33). Use firm, circular movements from the center outward. This motion will move surface skin contaminants away from the proposed venipuncture site.

(2) Discard swab.

(3) Allow the skin to dry, or dry with sterile gauze, if available.

CAUTION

Do not palpate the area again after cleansing.

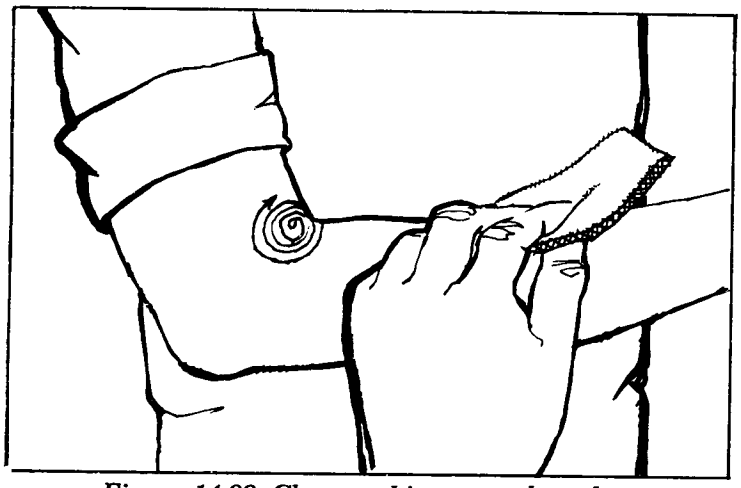

Figure 14-33. Cleanse skin over selected area.

n. Prepare for venipuncture.

(1) Remove protective cover from needle.

(2) Position needle in line with vein and hold patient's arm below cleansed area with free hand.

(3) Place your thumb 1 inch below entry site and draw patient's skin to hold skin taut over selected puncture site.

o. Puncture the vein.

(1) Take the needle, bevel up (Figure 14-34), and place it in line with the vein. Pierce the skin at approximately a 15^{o} to 45^{o} angle. (Enter the vein with the bevel up so that the sharp tip can pierce the skin first, preparing the way for the rest of the needle. Entering the vein with the bevel down causes painful tearing of the skin.)

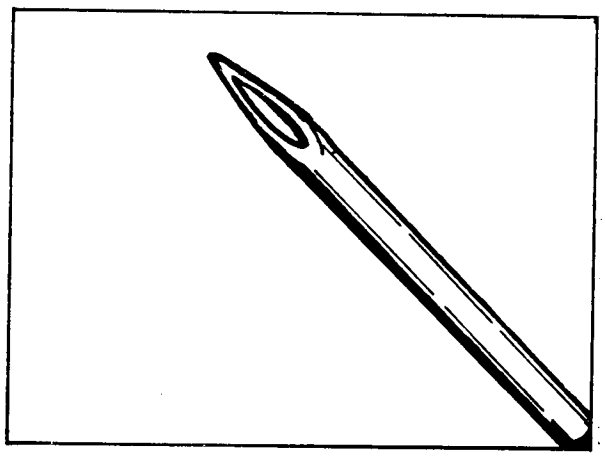

Figure 14-34. Needle, bevel up.

(2) Decrease angle until needle is almost parallel to skin surface.

(3) Direct needle into the vein, piercing vein wall. When the vein is punctured, you will feel a slight "give" on entry into the lumen (passage) of the vein.

(4) Advance needle slightly and watch for increased blood flow. Blood will appear in the hub of the needle.

CAUTION

Use care to prevent puncturing the opposing vein wall.

(5) If the vein is not punctured, pull the needle back slightly, but *not* above the skin surface. Try to direct the needle point into the vein again.

CAUTION

If the needle is withdrawn above the skin surface, obtain a new needle before trying venipuncture again.

(6) If venipuncture is still unsuccessful—

(a) Release the constricting band.

- *Latex tubing:* Pull on the long end of the loop.
- *Commercial band:* Release Velcro fastener.

(b) Place a 2 inch by 2 inch sponge lightly over the venipuncture site.

(c) Quickly withdraw the needle.

(d) Immediately apply firm pressure over the site.

(e) Notify supervisor before attempting to enter another vein.

p. Collect specimen. Hold the Vacutainer needle and unit steady with the hand used to do the venipuncture (Figure 14-35). Keep the needle at the same angle. This action prevents the needle from slipping out of the vein and from through-and-through penetration of the vein walls.

(1) Place the index and middle fingers of your free hand behind the flange of the holder.

(2) Place thumb of same hand on end of tube. Push on tube as far forward as possible. When the needle enters the tube stopper, the vacuum draws blood into the tube.

(3) Instruct patient to relax and ask him to unclench his fist after needle has entered vein.

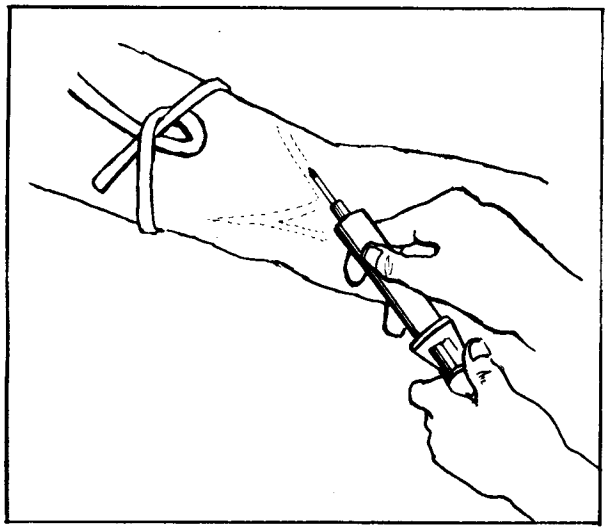

Figure 14-35. Withdrawal of blood.

(4) When tube is two-thirds full or if blood stops flowing into the tube, prepare to withdraw the needle.

NOTE

For multiple specimens, remove the filled tube and insert another tube. Repeat this procedure until the desired number of tubes are filled.

(5) Release constricting band after the required number of tubes are filled (Figure 14-36).

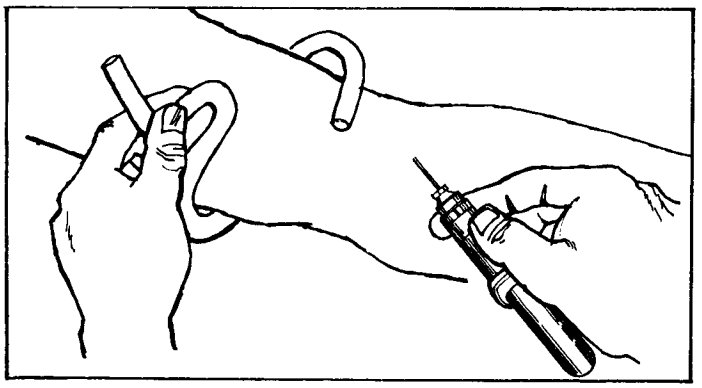

Figure 14-36. Release of constricting band.

q. Withdraw needle.

CAUTION

Do not withdraw the needle before the constricting band is released because of danger of blood loss and/or possible formation of hematomas. Hematomas are tumor-like clusters of blood under the skin.

(1) Place 2 inch by 2 inch sponge lightly over venipuncture site (Figure 14-37).

(2) Withdraw needle smoothly and quickly and immediately press a 2 inch by 2 inch sponge firmly over the venipuncture site. Keep the patient's arm fully extended. This position minimizes leakage around and through the venipuncture site and prevents bruising and possible formation of hematomas.

(3) Tell the patient to elevate his arm slightly, to keep it fully extended, and to apply firm manual pressure to the site for 2 to 3 minutes. If the patient is unable to do this for himself, you must do it for him.

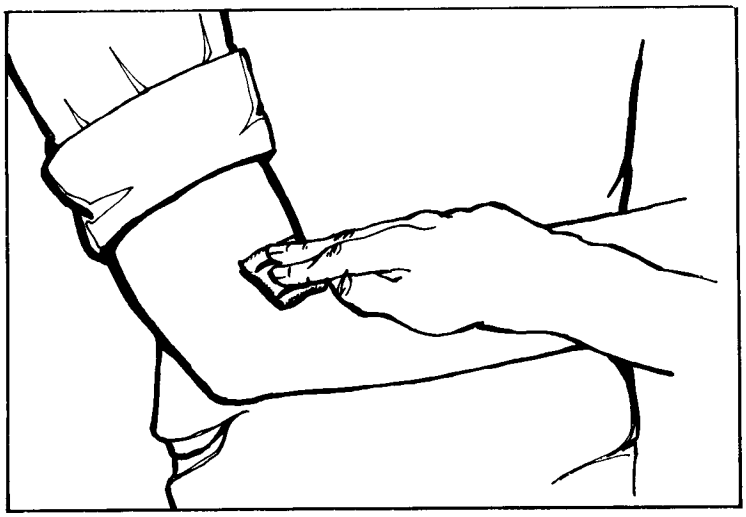

Figure 14-37. Place sponge over venipuncture site.

CAUTION

If a patient is receiving therapy to prevent or reduce blood clotting, continued bleeding may be a complication. Apply manual pressure to the venipuncture site for a longer period.

r. Remove specimen tube from holder.

(1) Put the protective cover over the needle.

(2) Pull the tube out of the holder.

(3) Gently invert tube several times to mix anticoagulant or other fixing agent, if used.

s. Apply plastic strip after bleeding stops.

t. Provide for patient's safety and comfort. Assist patient in rolling down his sleeve or putting on his garment.

u. Dispose of and/or store equipment.

(1) Collect all equipment and remove it from the area.

(2) Place all used sponges and other disposable material in the trash receptacle.

(3) Store the tourniquet and Vacutainer according to local SOP.

(4) Dispose of needle in the destructo-clip.

NOTE

If you accidentally puncture yourself with a used needle, tell your supervisor immediately, force the puncture site to bleed, and wash area well. Some diseases, such as hepatitis, can be transmitted by direct or indirect contact.

v. Check completeness of laboratory request (SF 546, Chemistry I; SF 549, Hematology; or local use laboratory request). As a minimum check for—

(1) Complete patient identification.

(2) Requesting physician's signature.

(3) Ward number, clinic, or dispensary designation.

(4) Date and time of specimen collection.

(5) Test(s) requested.

(6) Specimen source—blood.

(7) REMARKS—admission diagnosis or type of surgery.