CHAPTER 11

THE SENSORY SYSTEM

11-1. General

Sensations of smell, taste, sight, hearing, and equilibrium are usually referred to as special senses. These sensations are received through specialized sense organs or receptors which are sensitive to specific stimuli. Other sensations such as touch, pressure, pain, heat, and cold are received through receptors in the skin, underlying tissue, and viscera. Impulses for both special and other senses are carried by sensory nerve pathways to the cerebrum. There the impulses are converted into sensation and perception (awareness or consciousness of sensation). The parts of the sensory mechanism are (1) the sense organ or receptor, (2) the pathway by which the impulse is conducted into the central nervous system, and (3) the sensory center in the cerebrum. The sensory mechanisms of the special senses are summarized as follows:

a. Smell. Cells located in the olfactory membrane of the nose are stimulated by odors. The olfactory membrane is located in the uppermost part of the nose. Impulses from receptors for odors are transmitted by the olfactory nerve. Although olfactory receptor cells are quite sensitive, they can also become fatigued. Smell is considered a primitive sense and the detection of odor is more highly developed in animals than in man.

b. Taste. Sense organs for taste are the taste buds, located on the surface of the tongue. The primary taste sensations are sweet, sour, salty, and bitter. The actual sensation of taste is influenced by the sense of smell. Taste sensation is usually dulled when nasal membranes are congested. Impulses from taste receptors are transmitted by the facial and glossopharyngeal nerves.

c. Sight. Cells in the retina of the eye are stimulated by light rays entering the eye. These stimuli create impulses that are carried by the optic nerve.

d. Hearing. Cells in the cochlea of the inner ear are stimulated by vibration of sound waves. These stimuli create impulses that are carried by the acoustic (auditory) nerve.

e. Equilibrium. In addition to receptors for hearing, the internal ear contains three semicircular canals which regulate the sense of equilibrium. Change in position of the head causes movement of fluid within the canals. The fluid movement stimulates nerve endings in the walls of the canals which send impulses to the brain by the vestibular branch of the auditory nerve.

11-2. The Ear

The ear, the organ of hearing, consists of three parts: the external ear, the middle ear (tympanic cavity), and the internal ear (the labyrinth) (Figure 11-1). These divisions are commonly referred to as the outer ear, the middle ear, and the inner ear. They provide for the reception and conduction of sound and contain one of the principal mechanisms of equilibrium. The structures of the ear, except the part protruding from the head, are situated within the temporal bone of the skull.

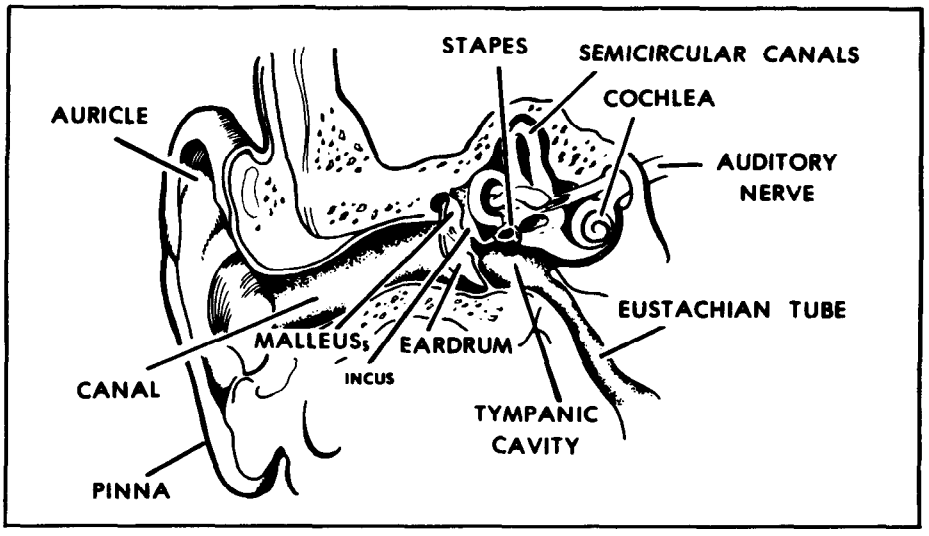

Figure 11-1. The external, middle, and internal ear, frontal view.

a. The external ear (Figure 11-2) consists of the shell-shaped portion of the ear, called the auricle (pinna), which projects from the side of the head, and the external auditory canal leading toward the middle ear. The principal function of the external ear is the collection and conduction of sound waves to the middle and inner ear. The auricle is composed of cartilage covered with membrane and the skin.

(1) The prominent folded rim of the ear is the helix.

(2) A deep cavity, the concha, leads into the external auditory canal.

(3) In front of the concha and projecting backward over the entrance to the external auditory canal is a small, triangular piece of cartilage called the tragus. The undersurface of the tragus is covered with soft hairs which help prevent foreign bodies from entering the ear.

(4) The lobe is the lowest point of the helix. The lobe is composed of fatty tissue and connective tissue, but does not have any cartilage.

b. The external auditory canal extends from its entrance to the tympanic membrane (eardrum) which closes its inner end. The canal is formed of two parts: (1) its outer (cartilaginous) part which is formed of cartilage and membrane; and (2) its inner (bony) portion which is formed by a passage in the temporal bone.

(1) If the auricle (helix area) is pulled up and back, the outer canal straightens and may be examined or treated more easily. Near the entrance of the canal, the skin contains wax-producing glands and hair follicles. This wax, called cerumen, helps prevent the entry of foreign objects into the ear.

(2) The tympanic membrane (eardrum) separates the inner end of the canal from the middle ear. The normal eardrum is partly translucent and shiny gray (pearl-like). When inflamed, it appears pink or dull red.

c. The middle ear (tympanic cavity) is an irregular space in the temporal bone filled with air and containing the three ossicles of the ear: malleus (hammer), incus (anvil), and stapes (stirrup). These bones conduct vibrations from the eardrum to the internal ear. The eustachian tube connects the middle ear with the nasopharynx. Its principal function is to keep the air pressure equal on either side of the eardrum. This is also an avenue of infection by which disease spreads from the throat to the middle ear.

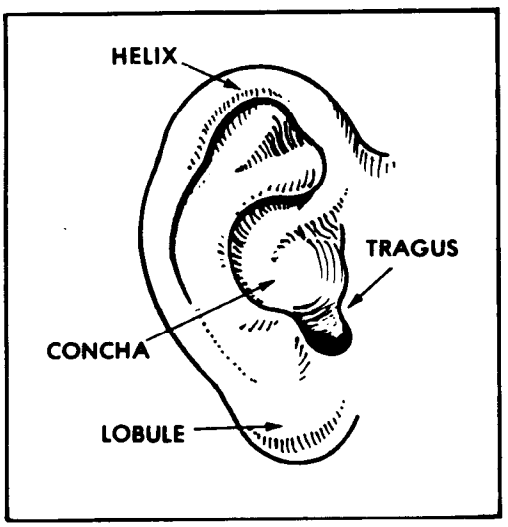

Figure 11-2. The auricle.

d. The internal ear (labyrinth) contains receptors for hearing and equilibrium. The receptor for hearing lies within the cochlea which is coiled and resembles a snail shell.

(1) Sound waves, which pass through the external auditory canal, vibrate the eardrum and ossicles and are transmitted through the fluid of the inner ear. Nerve impulses travel through the acoustic (auditory) nerve to the auditory center of the cerebral cortex.

(2) The internal ear also contains three semicircular canals which control equilibrium. Change in the position of the head causes movement of the fluid within the canals and this fluid movement stimulates nerve endings in the wall of the canal. These nerve endings serve as receptors and transmit impulses along the acoustic nerve to the cerebellum.

11-3. The Eye

The eye is specialized for the reception of light. Each eye is located in a bony socket or cavity called the orbit, which is formed by several bones in the skull. The orbit provides protection, support, and attachment for the eye and its muscles, nerves, and blood vessels.

a. The Eyeball. The interior of the eye (Figure 11-3) is divided into an anterior cavity (anterior to the lens) and a posterior cavity (posterior to the lens). A clear watery solution (aqueous fluid) is formed and circulated in the anterior cavity. A transparent semifluid material (vitreous fluid) is contained in the posterior cavity. The globular form and firmness of the eyeball is maintained by its fluid contents which also functions in the transmission of light.

(1) *Eye tissue coats.* The eyeball has an outer coat, a middle coat, and an inner coat.

(a) Outer coat. The outer coat consists of a normally transparent anterior portion, the cornea, and a fibrous white portion, the sclera. The cornea focuses and transmits light to the interior of the eye. The sclera helps maintain the shape of the eyeball and protects the delicate structures within.

(b) Middle coat. The middle coat consists of the choroid, iris, and ciliary body. The choroid, the vascular middle layer of the eyeball, lines the posterior portion of the eye from the ciliary body to the optic nerve. The iris is a circular, colored, muscular membrane which is suspended between the cornea and the lens. The pigment in the iris gives the eye its characteristic color. The round opening in its center is the pupil. The muscle structure of the iris adjusts the size of the pupil to adapt the eye to the brightness of light. The ciliary body lies between the iris and choroid; it has a muscular function, changing the focus of the lens, and a secretory function, producing aqueous fluid.

(c) Inner coat. The inner coat is the retina which lines the interior of the eye except toward its anterior inner surface. The visual nerve cells (rods and cones) are arranged closest together at the central portion of the retina, the macula lutea. A slight depression in the macula lutea is the fovea centralis. Medial to the fovea centralis is the area called the optic disk, the site of exit of the optic nerve. The inner surface of the retina is in contact with the vitreous and the outer surface with the choroid. The condition known as "detached retina" means that some portion of the retina has become separated from the supporting choroid.

(2) *The lens.* The lens is a small, disk-shaped, transparent structure about 1/3 inch in diameter. It is situated behind the iris and in front of the vitreous cavity. The lens is suspended by the suspensory ligament. This ligament is attached to the ciliary body. Muscular movements of the ciliary body affect the suspensory ligament and focus the lens. The condition of "cataract" means that some portion of the lens has become cloudy (opaque).

(3) *Aqueous fluid.* The aqueous fluid is formed by the ciliary body and fills the two divisions of the anterior cavity of the eye, called the anterior and the posterior chamber. Aqueous fluid is crystal clear for transmission of light rays. Its formation and flow help maintain the normal intraocular pressure. The aqueous fluid flows from the posterior chamber to the anterior

chamber and drains by means of a series of channels into the venous blood. Interference with the normal formation and flow of aqueous fluid can lead to development of excessively high intraocular pressure, a condition called glaucoma.

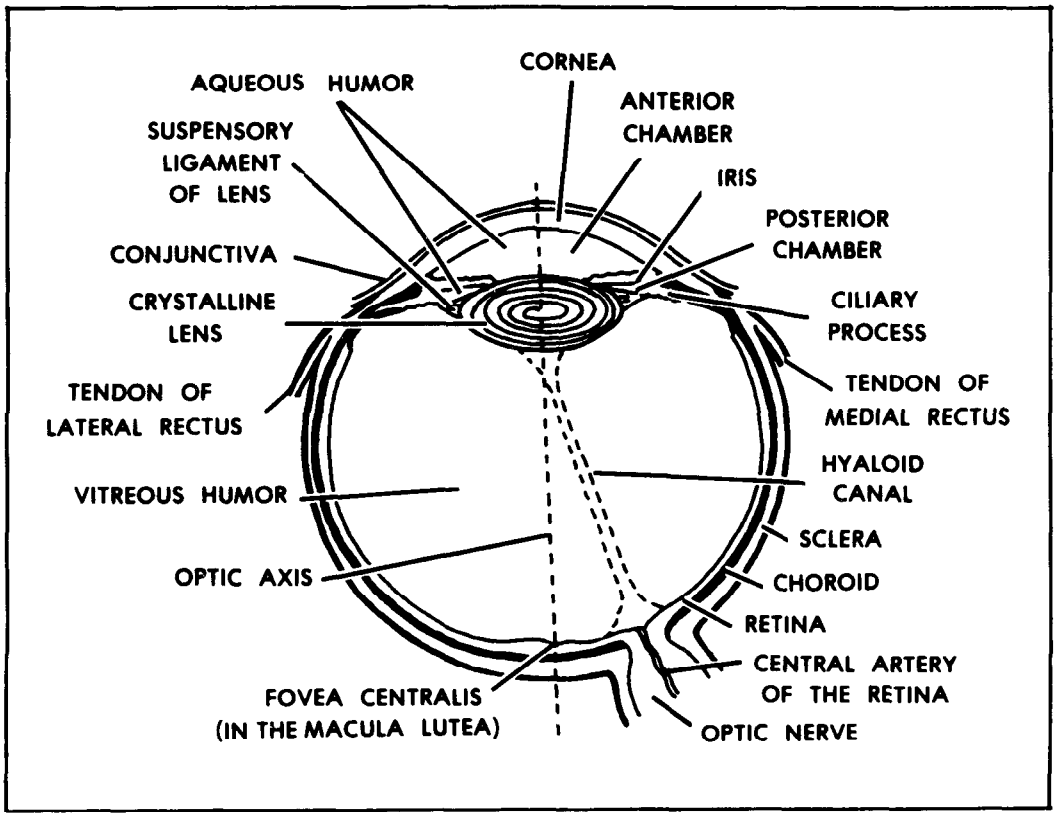

Figure 11-3. The eye.

b. The External Eye and Accessory Structures. Viewed from the surface of the body, the anterior surface of the eye and some of its accessory structures (such as eyebrows, lids, lashes, and conjunctiva) are readily visible. An additional essential accessory structure is the lacrimal (tear) apparatus (Figure 11-4).

(1) *Eyebrows and eyelashes.* The eyebrow and lashes are usually considered to have a cosmetic (decorative) function, but the eyelashes protect against the entrance of foreign objects. On the margin of the eyelids near the attachment of the eyelashes are the openings of a number of glands. Infection in these glands is commonly called a sty.

(2) *Eyelids.* The eyelids are thin, moveable, protective coverings for the eyes. The junctions of the upper and lower eyelids of each eye are canthi. The inner canthus (Figure 11-4) is at the nasal junction and the outer canthus is at the temporal junction.

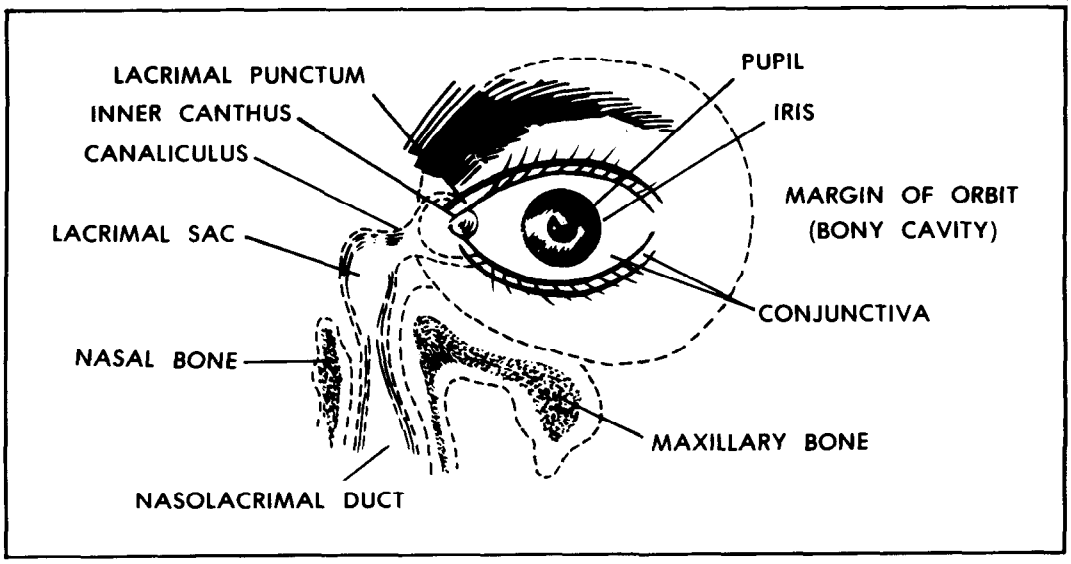

Figure 11-4. The external eye and accessory structure.

(3) *Conjunctiva.* The conjunctiva (Figure 11-4) is a delicate mucous membrane which lines the inside of the eyelids and covers the front surface of the eyeball. The semitransparent conjunctiva appears white on the front surface of the eyeball where it covers the sclera and pink where it overlies lid tissue. Should the conjunctiva itself become inflamed or infected, it appears red and swollen. (One type of acute bacterial infection of the conjunctiva is commonly called "pinkeye.")

(4) *The lacrimal apparatus.* The lacrimal apparatus consists of the lacrimal gland, lacrimal ducts, lacrimal sac, and nasolacrimal duct (Figure 11-4). Its function is the secretion and drainage of tears. The lacrimal gland is about the size and shape of a small almond and is located in a small depression on the lateral side of the frontal bone of the orbit. Many small ducts drain tears secreted by the gland to the conjunctival surface; the tears drain downward and toward the inner angle of the eye. The normal blinking of the eyelids helps spread the tears evenly to provide a lubricating, protective, moist film over the exposed surface of the cornea. The tears drain into openings near the nasal portion of each eyelid (lacrimal puncti) and then into the tear ducts, the sac, and finally into the nose through the nasolacrimal duct. This normal function and drainage of tears is the natural way in which the eye surface is kept clean and moist.

(5) *Extraocular muscles.* There are six sets of muscles located outside the eyeball. These muscles raise, lower, or rotate the eyeball within its socket. The muscles of the two eyes normally function in a coordinated manner so that both eyes move simultaneously and are aimed in the same direction.

CHAPTER 12

TRIAGE AND PATIENT ASSESSMENT

Section I. TRIAGE

12-1. General

Triage (pronounced tree-ahzh) is the French word for "sorting." In medicine, it refers to the sorting of casualties to establish priorities of treatment and evacuation. Triage is generally applied to situations in which there are several casualties; however, the word can also refer to the assessment of one patient with multiple injuries in order to decide which injury should be treated first. In this chapter, we will examine triage and the techniques used when dealing with mass casualty situations.

12-2. Principles of Triage

Whether you are dealing with one patient who has multiple injuries or many injured people, the fundamental principles of triage are the same:

a. Asphyxia and hemorrhage are the two immediate threats to life.

b. Salvage of life takes priority over salvage of the limb.

NOTE

These two principles should guide all of your work with critically injured patients and dictate the priorities of treatment.

12-3. Triage of the Multiple Injured Patient

You may not have used the word "triage" before, but every time you have performed the proper sequence of treatment, you were performing triage: sorting out the patient's problems according to priorities. Triage of the multiple injured patient begins with the primary survey, with emphasis on airway, breathing, and circulation (ABC's).

a. Airway. The airway remains the first consideration. The trauma victim, if unconscious, will have his airway obstructed by the base of his tongue. The usual solution of tilting the head back is not adequate because every severely injured, unconscious victim is considered to have a cervical spine injury until proven otherwise. The approach is modified by using the jaw thrust method of opening the airway. By using this method, any motion of the head and/or neck is avoided. The tongue, blood, vomitus, avulsed teeth, or broken dentures may obstruct the airway of a trauma victim. To insure that the airway of the trauma victim is open you must:

(1) Open the airway, avoiding any movement of the head or neck.

(2) Clear foreign material manually or with suction. Remember to always anticipate vomiting.

(3) Keep the unconscious patient turned on one side (after the spine is properly stabilized) so that foreign materials can drain from the patient's mouth.

(4) Facial fractures around the mouth and trachea are extreme emergencies and the patient should be evacuated immediately.

b. Breathing. Insure the patient is breathing adequately. If the victim is not breathing, artificial ventilation must be started promptly and supplemented as soon as possible with high concentrations of oxygen. Even if the patient is making respiratory efforts, there are a number of injuries that can decrease the effectiveness of the respirations. For instance, sucking chest wounds will prevent adequate expansion of the lung; these wounds must be closed without delay. To insure respiration in the trauma victim, you must—

(1) Start artificial ventilation for apnea.

(2) Close sucking chest wounds.

(3) Decompress the chest at once or evacuate the victim without delay if tension pneumothorax is evident.

(4) Note presence of flail chest (stabilize later).

(5) Give oxygen to every severely injured patient.

c. Circulation. When we discuss circulation in the context of trauma, we are talking principally about control of bleeding and treatment of shock. Both actions must be accomplished as rapidly as possible once the airway and breathing have been insured. To insure circulation in a trauma victim, you must—

(1) Start external cardiac compressions if there is no pulse.

(2) Control bleeding with direct pressure.

(3) Anticipate shock in every severely injured patient and treat accordingly.

12-4. The Secondary Survey

Having dealt with the ABC's, you have now taken care of the conditions that pose an immediate threat to life. Recall, however, the second principle of triage: salvage of life takes priority over salvage of limb. This means that a patient may have to be moved before treatment is completed. For instance, a patient with pericardial tamponade must be evacuated with all possible speed, even if splinting of fractures has not been completed.

12-5. Multiple Casualties

Situations involving several casualties may be the most difficult and challenging you will face. Not only does the multiple casualty situation require you to employ the skills of judgment and emergency care, but it also demands that these skills be exercised under frequently difficult conditions.

12-6. Sorting of Casualties

The goal of this process is to accomplish the greatest good for the greatest number, remembering that the highest priority is keeping the patient alive. Sorting of casualties (triage) is conducted in several rounds. On the first round, you should identify those patients who require immediate attention according to the familiar priorities of airway, breathing, and circulation.

12-7. Categories of Triage

a. Immediate—to Save Life or Limb.

(1) Airway obstruction.

(2) Respiratory and cardiorespiratory failure (cardiorespiratory failure is not considered an "immediate" condition on the battlefield; it would be classified as expectant).

(3) Massive external bleeding.

(4) Shock.

(5) Sucking chest wound, if respiratory distress is evident.

(6) Second or third degree burns of the face and neck, or perineum (causing shock or respiratory distress).

(7) After casualty with life/limb threatening conditions has been initially treated, no further treatment will be given until other "immediate" casualties have been treated.

b. Delayed—Less Risk by Treatment Being Delayed.

(1) Open chest wound.

(2) Penetrating abdomen wound.

(3) Severe eye injury.

(4) Avascular limb without apparent blood supply.

(5) Other open wounds.

(6) Fractures.

(7) Second and third degree burns not involving the face and neck or perineum.

c. Minimal—Can Be Self Aid or Buddy Aid.

(1) Minor lacerations.

(2) Contusions.

(3) Sprains.

(4) Minor combat stress problems.

(5) Partial thickness burns (under 20 percent).

(6) Patients in this category are not evacuated to a medical treatment facility.

d. Expectant—Little Hope of Recovery. This category should be used only if resources are limited.

(1) Massive head injury with signs of impending death.

(2) Burns—more than 85 percent of the body surface area.

NOTE

Casualties with minor injuries can assist with (1) recording treatment, (2) emergency care, and (3) defense of the area.

Section II. PATIENT ASSESSMENT

12-8. General

At any level of medical treatment, evaluation of the patient must come before treatment. A good evaluation should be used to discover a condition rather than confirm it. Therefore, you must perform a thorough, advanced examination that proceeds in a logical pattern, uncovering all important findings needed to make good prehospital treatment decisions. The first in the sequence of examining the patient is the triage examination or initial patient assessment.

12-9. Assessment Tools

To perform a complete patient assessment, you need a penlight, wristwatch, stethoscope, blood pressure cuff, your eyes for inspection, your ears for hearing, and your hands for palpation.

12-10. Techniques for Patient Assessment

a. Inspection. Look for colors, contours, masses, bleeding, and any changes in the physical appearance of the part being examined.

b. Auscultation. Listen for breath sounds and apical (heartbeat) pulse.

c. Palpation. Feel for textures, consistency, depressions, moisture, and temperature.

12-11. Triage Examination

The triage examination determines if any life-threatening conditions exist; it allows for simple treatment steps to protect vital functions.

a. Airway. Check for open airway. If the airway is closed, you should open it with manual maneuvers.

(1) *Head tilt-chin lift.* This technique provides a consistently more effective method of opening the airway in the unconscious victim and is less tiring than other methods.

(2) *Head tilt-neck lift.* This technique should never be used if victim has a suspected cervical spinal injury.

(3) *Jaw thrust.* This technique is the safest first approach to opening the airway of a victim who has a suspected neck injury because, in most cases, it can be accomplished without extending the neck.

NOTE

It should be noted that if the victim is making respiratory efforts, the airway may still be obstructed. Many times opening the airway is all that is needed.

b. Breathing. Check for breathing by using the *Look, Listen,* and *Feel* technique. If patient is not breathing, give four quick ventilations.

c. Circulation.

(1) *Pulse.* Check for a carotid pulse. It is important to check the carotid pulse because it is most accessible, most reliable, and most easily learned and remembered. If the carotid pulse is absent, begin cardiac compressions. In triage, under combat conditions, you should move on to other injured patients.

(2) *Bleeding.* Check for persistent external bleeding. If there is profuse bleeding, apply direct pressure and elevate. In some instances, a tourniquet may be required.

(3) *Level of consciousness.* Check the casualty's level of consciousness (for example, can he talk, does he understand what you are saying to him). If traumatic injury is present, apply a cervical collar, if available, or stabilize the neck with sand bags, or a wire ladder splint made into a cervical collar.

NOTE

See Chapter 13 for specific instructions concerning the application of the ABC's.

12-12. Vital Signs (Pulse, Blood Pressure, Respiration, and Temperature)

a. Pulse. Normal pulse for adults is 60-80 heartbeats per minute, for children 80-100, and for infants 120-160. Also observe its regularity and strength.

b. Blood Pressure. Normal blood pressure for an adult is 110-146 mm/Hg systolic and 60-90 mm/Hg diastolic. Infant readings are 50-80 mm/Hg systolic and 40-58 mm/Hg diastolic.

c. Respiration. Normal respiratory rate for adult is 12-20 per minute; for children, a higher rate is normal. Also, observe the rhythm and depth.

d. Temperature. Normal temperature is 98.6°F (37.0°C). If patient shows symptoms of shock (weak, rapid pulse; pale skin; skin that is cool and moist to the touch), control of the shock should be achieved before continuing with the assessment.

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12-13. Head-to-Toe Examination

a. General appearance would include the patient's general skin color, obvious wounds or eviscerations, presence of the odor of alcohol, dress, social condition, and presence of cigarettes. Skin color may be red (fever, allergic reactions, carbon monoxide poisoning), white (excessive blood loss, fright), blue (hypoxemia, peripheral vasoconstriction from cold or shock), yellow (indicative of liver disease, especially hepatitis; may also be seen in sclera), or mottled (cardiovascular shock).

b. Degree of distress is the patient's response to his illness or injury and normally varies among individuals. This is usually classified as mild, moderate, or severe.

c. State of consciousness is based on the Glascow Coma Scale, which is explained below. (Pain is elicited by rubbing the sternum while examining the ribs.)

(1) Eye opening response:

(a) 4—Spontaneous.

(b) 3—Responds to verbal stimuli.

(c) 2—Responds to painful stimuli.

(d) 1—No response.

(2) Verbal response:

(a) 5—Oriented to person, place, and time.

(b) 4—Confused.

(c) 3—Inappropriate words.

(d) 2—Incomprehensible words.

(e) 1—No response.

(3) Motor response:

(a) 6—Follows commands.

(b) 5—Localizes pain.

(c) 4—Withdraws from painful stimuli.

(d) 3—Exhibits flexion to painful stimuli.

(e) 2—Extension to painful stimuli.

(f) 1—No response.

d. The patient is scored by adding the numbers the patient receives in each category of the examination. This score is placed over a maximum score of 15 (the score becomes a fraction; 15/15 would be the score received by a fully alert patient).

e. Examine:

(1) *Scalp.* The scalp is examined for the presence of bleeding or contusions and palpated for tenderness or depression. Do not move the neck!

(2) *Forehead.* Touch the forehead with the back of your hand to ascertain both temperature and moisture.

(3) *Eye.*

(a) Eyelids—check for raccoon eyes (bilateral discoloration without swelling).

(b) Pupils—check for dilation or constriction, equality or inequality, roundness, eye movement, and gross acuity (by following finger).

(c) Conjunctiva—pull one of the lower eyelids down to check color on the inside of the lid.

(4) *Nose.* Check for deformity, bleeding, or discharge.

(5) *Ears.* Inspect for drainage or bleeding without turning patient's head.

(6) *Mastoids.* Check for bruising or defined discoloration (Figure 12-1) or Battle's sign (bruising behind the ear), which may indicate a skull fracture.

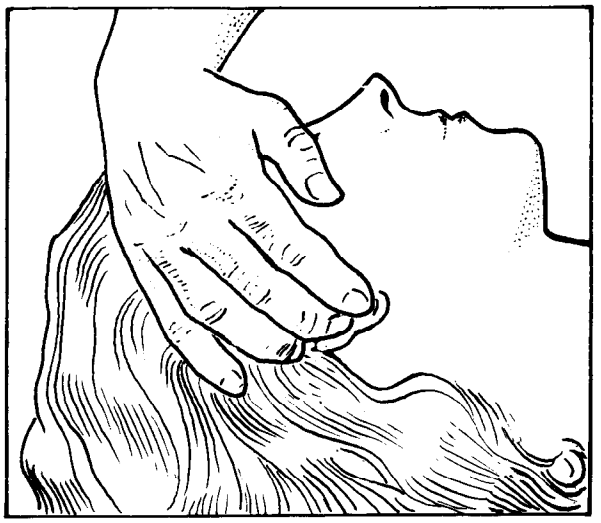

Figure 12-1. Looking for discoloration.

(7) *Facial bones.* Examine the face for lacerations or contusions; palpate zygomatic arches, maxilla, and mandible for tenderness (Figures 12-2 and 12-3).

Figure 12-2. Palpating zygoma for fractures.

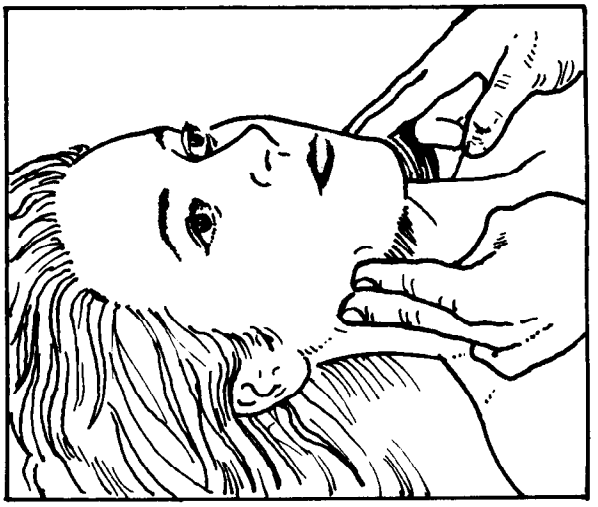

Figure 12-3. Palpating mandible for fractures.

(8) *Mouth.* Examine the mouth for loose teeth, abnormal alignment, oral hydration, and visibly check for perioral cyanosis.

(9) *Tracha.* Check for midline position, presence of stoma, and medicalert necklace.

(10) *Suprasternal area.* Check for retractions, accessory muscle usage, and subcutaneous emphysema.

(11) *Neck veins.* Check for distension (Figure 12-4); if distension is present, see if the veins fill from above (the head) or below (the heart).

(12) *Cervical spine.* Check for deformity or midline point tenderness without moving patient (Figure 12-5).

(13) *Chest wall.* Examine for paradoxical breathing (flail chest—when a portion of chest wall goes in on inspiration, out on expiration), splinting, or retractions (Figure 12-6).

(14) *Ribs.* Examine for bruising or tenderness during chest compression. Do not push over any abrasive bruise (Figure 12-7).

(15) *Thoracic spine.* Palpate for deformity or tenderness without moving the patient.

(16) *Breath sounds.* Check in the four quadrants, anterior and posterior. Bilateral equality is noted, as in the presence of rales (fine crackling sounds indicating fluid), Rhonchi (coarser sounds indicating fluid in larger airways; "bubbling"), or wheezes (whistling sounds).

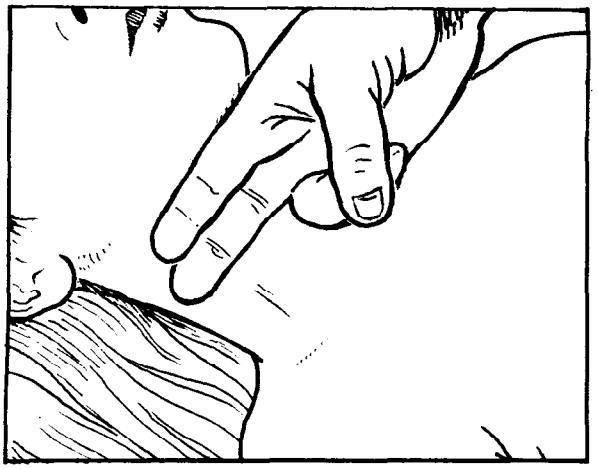

Figure 12-4. Check neck veins for distension.

Figure 12-5. Palpating the cervical spine.

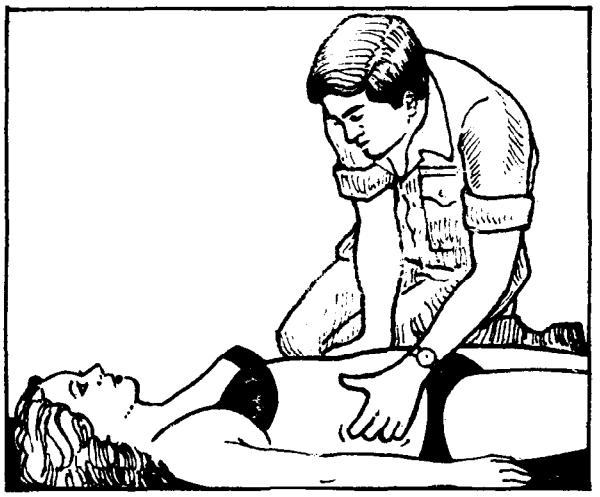

Figure 12-6. Checking for flail chest.

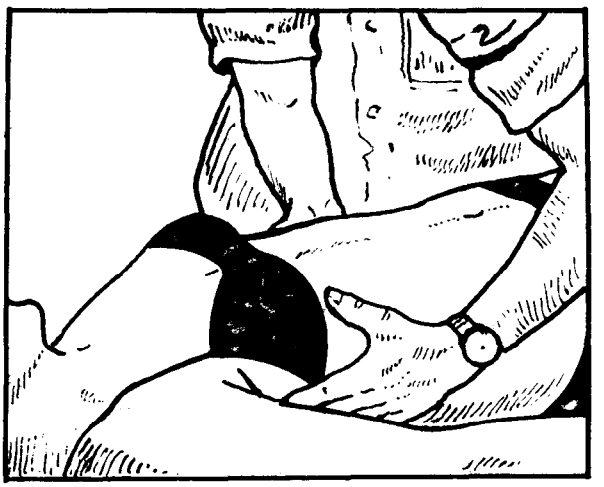

Figure 12-7. Examining for rib tenderness.

(17) *Apical pulse.* Auscultate the heart for apical rate and possibility of muffled heart tones.

(18) *Abdomen.*

(a) External—observe for wounds, distension, or evisceration of bowel.

(b) Bowel sounds—auscultate for bowel sounds; if absent, mention the amount of time listening.

(c) Abdominal tenderness—palpate lightly for tenderness; note presence of rigidity.

(19) *Lumbar spine.* Palpate for deformity or tenderness without risking spinal injury.

(20) *Pelvis.* Compress the pelvis with hands covering the hip joint and iliac crest. Note any pubic tenderness or incontinence (Figure 12-8).

(21) *Femoral pulses.* Check for presence and bilateral equality.

(22) *Lower extremities.*

(a) Legs—inspect and palpate both legs for bleeding, tenderness, and deformity.

(b) Calves and tibias—check the calves for pain on squeezing and the tibias for pitting edema.

(c) Pedal pulses—palpate both feet for either the dorsalis pedis pulse or posterior tibial pulse (Figures 12-9, 12-10, and 12-11).

(d) Foot movement—examine feet for strength and sensation by having patient demonstrate ability to wave both feet and then check strength of extension.

(e) Foot sensation—ask patient to determine which toe is touched.

(f) Painful withdrawal—test withdrawal to pressure on the toe nail beds bilaterally.

(g) Reflexes—test knee jerk and ankle jerk reflexes (Figure 12-12); also check for Babinski reflexes (Figure 12-13).

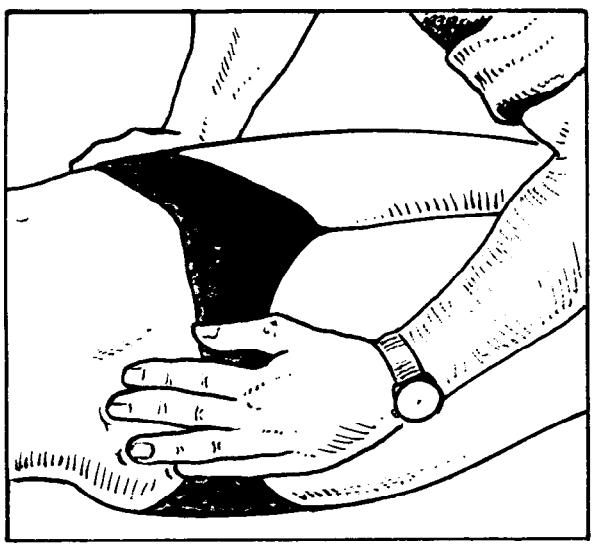

Figure 12-8. Testing pelvis for compression pain.

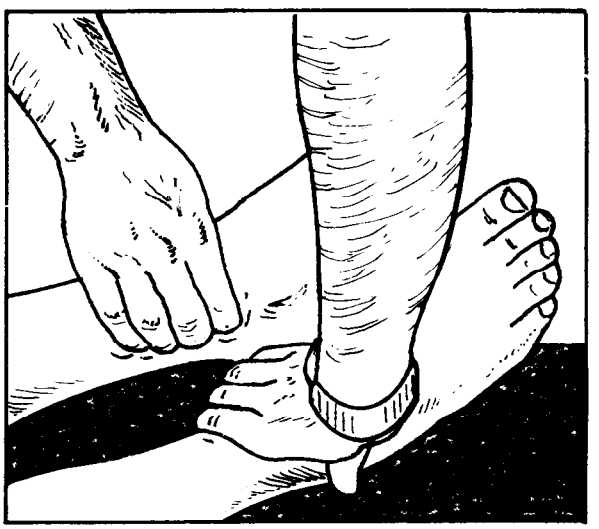

Figure 12-9. Palpating for pedal pulses.

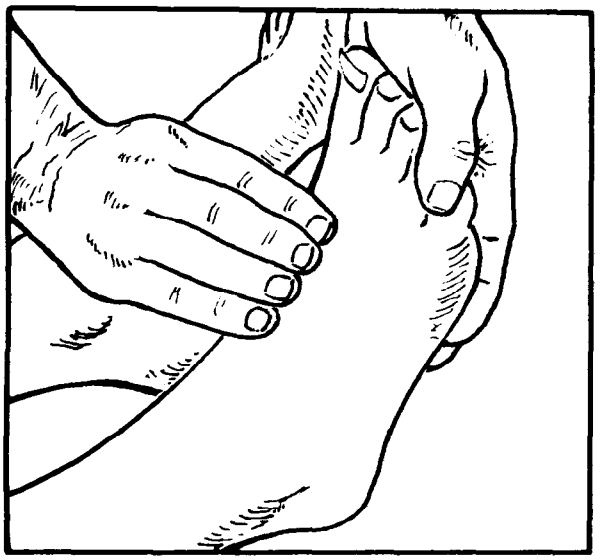

Figure 12-10. Palpating for dorsalis pedis pulse.

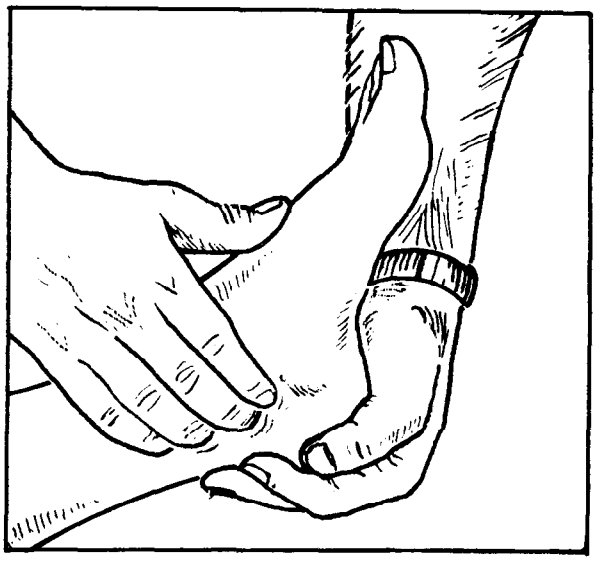

Figure 12-11. Palpating for posterior tibial pulse.

Figure 12-12. Testing knee jerk reflexes.

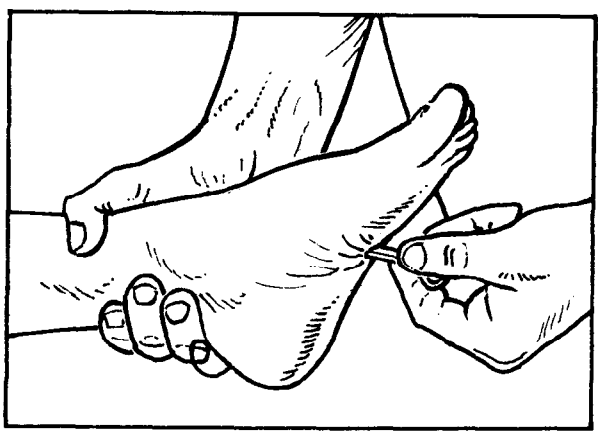

Figure 12-13. Testing Babinski reflexes.

(23) *Upper extremities.*

(a) Clavicles—palpate both clavicles from the sternum towards the shoulder for tenderness or deformity.

(b) Arms and forearms—inspect and palpate both arms for bleeding, tenderness, and deformity.

(c) Radial pulses—compare radial pulses for presence and equality (if unequal, compare blood pressures bilaterally).

(d) Hand movement—instruct patient to wave both hands to confirm flexion and extension. Check grip strength.

(e) Hand sensation—ask patient to determine which finger is touched.

(f) Painful withdrawal—test withdrawal to pressure on thumb nail beds bilaterally.

(g) Reflexes—test biceps reflexes (Figure 12-14).

(24) *Back.* Log roll and observe—log roll the patient unless spine injury is suspected, and observe for any posterior wounds.

(25) *Rhythm strip.* If possible, check the heart rhythm on a cardiac monitor.

Figure 12-14. Testing biceps reflexes.

Section III. PRIORITIES FOR MEDICAL EVACUATION

12-14. General

Assignment of medical evacuation priorities is necessary because it provides the supporting medical unit and controlling headquarters with information that is used in determining the commitment of available evacuation assets. It is for this reason that correct assignment of evacuation priority is essential. Overclassification of casualties has been, and continues to be, a problem. They will be picked up by evacuation resources as soon as possible, consistent with available transportation means and pending missions.

12-15. Evacuation Priorities

One of three different priorities can be assigned to a casualty, depending on the severity of their wound(s)/illness:

a. Urgent—this precedence is assigned to emergency cases that should be evacuated as soon as possible and within a maximum of 2 hours in order to save life, limb, or eyesight. Casualty's stabilization cannot be controlled.

(1) Shock—does not respond to IV therapy.

(2) Head injury—increase in intracranial pressure.

(3) Avascular limbs.

(4) Open chest/abdominal wounds.

(5) Uncontrollable bleeding.

(6) Severe burns—20 to 85 percent of the body surface area, or involving the face and neck.

b. Priority—this precedence is assigned to sick and wounded personnel needing prompt medical care. It is used when stabilization is difficult and the patient should be evacuated within the next 4 hours to prevent his condition from deteriorating to urgent precedence.

(1) Chest injury with pericardial tamponade, pneumothorax, hemothorax, or multiple risk fractures.

(2) Injuries which interfere with respiration.

(3) Abdominal injuries.

(4) Eye injuries.

(5) Spine injuries.

(6) Burns of hands, feet, genitalia, perineum, even if *less than 20 percent of the body surface is involved.*

c. Routine—this precedence is assigned to sick and wounded personnel requiring evacuation but whose condition is not expected to worsen significantly. Individuals in this category should be evacuated within 24 hours. Stabilization is under control.

(1) Closed fracture.

(2) Other open wounds.

(3) Psychiatric cases.

(4) Terminal cases.

12-16. Factors Affecting Medical Evacuation Decisions

a. Weather—single biggest factor in determining whether ground or air transportation can be employed.

b. Resources available—inadequate availability can sometimes delay evacuation for several hours. This means that careful consideration must be given before assigning evacuation priority.

c. Medical expertise available.

d. Tactical situation.

Section IV. TROOP MEDICAL CLINIC/ CONDUCT OF SICK CALL

12-17. General

a. A troop medical clinic (TMC) is a medical treatment facility designed primarily to provide outpatient examination and care for ambulatory patients, to treat emergency cases, and to arrange for admission to a hospital of a patient requiring inpatient care. The TMC also performs various administrative and preventive medicine activities related to the health of the personnel served. In general, the term "troop medical clinic" designates a facility situated away from the immediate vicinity of a hospital; the term "outpatient clinic" is used for a unit of the hospital that provides medical service primarily for nonhospitalized patients; and the term "aid station" designates a unit TMC providing primary medical care for troops in the field.

b. TMCs are the first level of medical service for all military personnel except those troops actually engaged in combat operations. Under combat or simulated combat conditions, first level medical service for troops is provided in aid posts and aid stations. TMCs are not merely first aid or sorting stations; they provide proper diagnosis and treatment for patients or transfer them to a hospital facility for inpatient care. The majority of patients seeking medical care do so because of minor sickness or injury. If these individuals are returned to duty from the TMC level without adequate examination and treatment, they can become less effective in their assignments.

c. The importance of professional medical care and good interpersonal patient relationships in TMC-level facilities cannot be overemphasized or exaggerated; a well-organized and efficiently-operated TMC is one of the most effective means of providing and extending medical service to the military community.

d. Some of the more important activities carried on by a TMC are:

- Emergency treatment.
- Sick call.
- Continuing routine treatment for patients who do not require hospitalization.
- Immunizations.
- Physical examinations.
- Sanitary inspections.
- Maintenance of individual health records.
- In some TMCs, provisions of medical and nursing care and observations of quarters-status patients who are admitted to the patient care bed unit of the TMC.

12-18. Routine Duties

The TMC must be kept ready so that patients can be received and treated in a clean and orderly environment. A common and workable method is to establish standing operating procedures (SOP) for daily and periodic routine duties that will not interfere with a smooth, uninterrupted flow of patients and that will take advantage of periods when the unit is free of patients. Each individual should have an assigned area of responsibility, to include treatment rooms, examining rooms, and rooms in common use such as waiting room, latrines, and corridors.

a. Daily Measures.

(1) At the beginning of the day and before treatment of patients begins, thoroughly air out the TMC; check emergency equipment, sterilizers, and treatment area supply levels (drugs, linen, instruments, utensils); check handwashing facilities for soap and paper towels; make a final check for dust and for orderly arrangement of equipment.

(2) As a concurrent measure throughout the day, check examining and treatment rooms after each use, to include removing all soiled linen, instruments, and gloves; replace supplies as required; and wipe up spills on floor and furniture immediately.

(3) During the noon period, air the waiting room and treatment area. Restore order for the afternoon's operations.

(4) At the end of the day, carry out general cleanup measures in order to have the TMC in readiness for the next day's operation. As each area is cleaned, restock and arrange all equipment in its proper place. Daily cleanup measures include damp dusting all furniture and damp mopping all floors, to include corners and behind doors.

b. Periodic Measures. Although these measures are not necessarily a part of the daily routine, observe them continually and accomplish the following at periodic intervals: cleaning windows; cleaning and replacing bulbs in ceiling lights; washing walls and woodwork; cleaning radiators and baseboards; caring for floors, such as removing wax, rewaxing, and polishing; and cleaning and rearranging cabinets and storage shelves.

12-19. Patient Receiving and Records Activities

a. General. The medical specialist works closely with and may perform part of the duties in the receiving and records section of the TMC. This section usually includes the reception and appointment desk and the records file. Organization of procedures at this station is essential to assure that—

(1) All individuals are received in a courteous, friendly, and professional manner.

(2) All patients are seen by a doctor with minimum delay.

(3) Emergency cases are seen first. Regardless of his reason for coming to the TMC, each individual who requests to see a doctor must be permitted to do so.

b. Routine Procedures. Routine procedures established for the receiving and records stations should include an SOP for—

(1) Handling records.

(2) Recording examination and treatments.

(3) Obtaining X-ray, laboratory studies, and other diagnostic measures such as consultations.

(4) Making appointments.

(5) Referring patients.

(6) Filing diagnostic reports returned to the TMC as the referring activity.

(7) Making necessary entries on the daily worksheet, in a ledger, or on machine records cards to facilitate preparation of the monthly Outpatients Report, DA Form 3537.

c. Ethical Aspects.

(1) *Privileged information.* Information given by the patient to the doctor and all medical and health records are privileged information in connection with professional medical care. The individual authorized access to information which is privileged or to information which would cause embarrassment to the patient will not reveal this information to those not officially concerned with the patient's medical treatment.

(2) *Female patients.* When medical examination or procedures are performed on adult or child female patients, a female nurse or attendant must be present. When female personnel are not assigned to the TMC, it is important to request that the husband, the parent, or a responsible female adult remain in the waiting room on call as needed as a chaperon. The male medical specialist assisting with patient care must make certain that an appropriate chaperon is present before preparing the patient for examination, before advising the doctor that the patient is ready for examination or treatment, or before performing any procedure himself.

d. Interpersonal Relations. The manner in which an individual is received when he comes to the reception desk and the things he observes while in the receiving area or waiting room create a lasting impression. The family member or friend who accompanies the patient is also concerned for the care and attention received. Four factors which foster good interpersonal relations under all circumstances are courtesy, concern for the individual, sympathetic understanding, and helpfulness.

12-20. Sick Call

Sick call (AR 40-2) is a daily assembly of sick and injured military duty personnel. Sick call is held each day at a designated place and time to provide routine medical examination and treatment for persons on duty status. Military personnel not reporting for medical treatment at sick call are seen on an appointment basis except that in an emergency they are seen at any time. After examination, patients medically unfit for duty are admitted to a hospital or confined to quarters. Patients not admitted will be given any necessary treatment. When excused from duty for medical reasons which do not indicate a need for hospitalization, military personnel may be authorized to occupy a bed in a TMC or to remain in quarters.

a. Individual Sick Slip. Each person who comes to the TMC on sick call should present an Individual Sick Slip (DD Form 689). The sick slip is prepared in the individual's unit orderly room. It is used to inform the unit commander of the status of an individual in his command who has reported on sick call. After examination and treatment of the patient, the attending medical officer indicates the disposition of the patient on the sick slip, which is returned to the unit commander. In exceptional cases, the treatment facility initiates the sick slip; for example, when an individual reports directly to the treatment facility in an emergency. Although the sick slip is not a part of the health record, it is an important means of communication in regard to the individual's duty status.

b. Dental Sick Call. Local policy may prescribe use of an Individual Sick Slip in connection with routine requests for dental attention. Provisions are made in each dental clinic to hold dental sick call. A definite period is set aside and personnel report directly to the dental clinic, not to medical sick call.

In a dental emergency, as in a medical emergency, patients are seen at any time. A dental officer of the day is available during other than normal dental clinic hours. After duty hours, personnel usually report to their regular TMC or clinic, and TMC personnel call the dental officer of the day.

12-21. Conducting Sick Call

NOTE

This is a typical sick call procedure which is subject to local modification.

a. Military Personnel, Usual Procedure.

(1) On arrival at the TMC, the individual reports to the TMC clerk and gives him the Individual Sick Slip. The clerk checks each slip to see that it contains the necessary information (individual's name, service number, grade, and organization).

(2) The clerk takes each patient's health record from the file for use by the attending doctor. The date of the patient's appearance on sick call is entered in the patient's Chronological Record of Medical Care (SF 600).

(3) A medical specialist receives the health record from the clerk; observes the patient; questions him about his complaint or condition; and takes his temperature, pulse, and respiration (TPR) for entry on the record.

(a) The TPR is taken and recorded as part of the routine examination procedure, since the significance of almost any symptom will change if accompanied by an elevated temperature.

(b) The specialist should talk to the patient, listen to his complaints, and observe signs and symptoms of distress or discomfort. Signs and symptoms that are readily observable during the initial contact with the patient include—

- Skin (observe lips and nail beds also, when applicable):
  - o Temperature—hot or cold to the touch.
  - o Color—flushed or pale.
  - o Rash—location.
  - o Wounds—location, condition of dressing if one is in place.
- Eyes and eyelids:
  - o Pupils—enlarged or pinpoint.
  - o Sclera—white, yellow, or red.
  - o Lids—swollen, encrusted, or clear at lid margins.

- Complaint of pain:
  - o Location.
  - o Start of pain—how and when.
  - o Type—sharp or dull, mild or severe, constant or intermittent.
- State of consciousness:
  - o Alert.
  - o Drowsy.
  - o Orientation to surroundings—knows where he is or seems confused.
- Nausea or vomiting:
  - o Time when started.
  - o If vomited, presence or absence of blood.
  - o Time, content, and source of last meal that was eaten.
- Temperature, pulse, respiration:
  - o Any marked deviation from normal, which is: temperature, 98.6^{O} (oral); pulse, 60 to 80; respiration, 14 to 20.
  - o Abnormalities of pulse rate and rhythm.
  - o Difficulty in breathing.
- General posture and gait:
  - o Sits and stands with or without difficulty.
  - o Walks with or without difficulty.

(c) Any patient with an obvious rash, an elevated temperature, a complaint of sore throat, or other upper respiratory symptoms that might indicate a communicable disease should not be left in a common waiting room in proximity with other patients. A separate waiting area should be provided. The SOP may specify that the doctor see the patient in the segregated area before requesting him to come to the examining room.

(4) The health record is taken to the doctor, who is informed immediately of any patient who appears to be acutely ill. The doctor calls in the patients one at a time, questions them, examines them, and determines what treatment they are to have.

(5) If the treatment procedure is one that can be carried out in the TMC, it will be given either by the doctor or by a designated assistant.

(6) If further diagnostic study is needed and it can be done while the patient is on a duty status, the doctor directs the clerk to prepare appropriate forms requesting a laboratory, clinic, hospital, or other suitable installation to do this work.

(7) If the doctor wants medicine dispensed to a patient, he writes a prescription and gives it to the patient, directing him to the TMC pharmacist. If the medicine is not available in the TMC, the patient may be instructed to take the prescription to a hospital pharmacy or he may have to return to the TMC after the pharmacist has obtained it.

(8) The doctor makes his entry on the patient's SF 600 and includes his determination of the patient's duty status: return to full duty; return to duty with limitations specified; or relieved of duty for "sick in quarters" or hospitalization.

(9) The doctor makes his entry on the Individual Sick Slip, indicating his disposition of the patient. (Local policy may include indicating the time that the patient was dismissed from Sick Call.)

(10) If it is necessary to hospitalize a patient, the doctor will direct the transfer procedure in accordance with local policy. An individual medical record is prepared for the patient transferred to the hospital. In some instances the clerk in the TMC will prepare this record; in other instances the A and D branch of the hospital registrar division prepares it.

(11) Patients requiring relief from duty but not hospitalization are carried as "sick in quarters." An individual medical record is prepared by the TMC clerk for each such case.

b. Nonmilitary Personnel Seen on Sick Call. When nonmilitary personnel are seen as sick call patients (that is, on a nonappointment basis), the procedures are usually the same as for military patients except that Individual Sick Slips are not used and a decision concerning duty status is not necessary.

c. Screening Patients on Sick Call. During normal sick call hours, the medical specialist may screen patients according to an SOP prescribed by the attending doctor. The screening procedure is done to designate priorities for examination by the doctor. As part of the screening procedure, the medical officer may permit a qualified nonprofessional assistant to evaluate and treat certain minor injuries and ailments, such as a scratch or minor abrasion, a cold with no cough or temperature elevation, or a slight headache. When this type of screening is permitted, the patient must be permitted to see a medical officer if he so requests.

d. Post Treatment Care on Sick Call. Following prescribed treatment in the TMC, the patient should not be dismissed until he has received any necessary instruction, medications, and future appointments. The medical specialist can do much to insure a better quality of patient care when he is able to reinforce the doctor's instructions by making sure the patient understands

what he must do as a self-care measure. It is essential that the medical specialist check the doctor's order on SF 600 and also check with the doctor so that all instructions he gives are in accordance with the doctor's instructions to the patient. If the patient on sick call has had medications administered which may produce drowsiness, any loss of coordination, or a delayed reaction, the medical specialist may often find it necessary to—

(1) Detain the patient in the TMC for a period of observation. The patient should not be seated in the common waiting room during this time unless no other suitable area is available. A cot or recovery bed is often provided adjacent to the treatment room for this purpose.

(2) Provide an escort if there is any question of the patient's ability to return alone to his orderly room or quarters.

12-22. Continuing Treatment in the Troop Medical Clinic

The doctor may order the patient to return to the TMC for a series of treatments over a period of days. (It may not be necessary for the patient to see the doctor each time he comes to the TMC for continuing treatments such as soaks, dressing changes, irrigations, repeated injections, or other treatment measures for which a written order has been entered on the patient's SF 600.) This general procedure should be followed:

a. The patient reports to the TMC or clinic at the specified hour.

NOTE

The original Individual Sick Slip may be used or the patient may have received DA Form 8-97 (Medical and Dental Appointment) at the time the follow-up appointment was made in the TMC.

b. The clerk obtains the patient's health record from the file, enters the date, and gives the record to the medical specialist.

c. The medical specialist is responsible for—

(1) Checking the doctor's order on SF 600 before any treatment is given. The order usually includes—

- Type of treatment.
- Number and duration of treatments.
- Dosage of medication.
- The time that the doctor desires to see the patient.

(2) Carrying out the treatment order. He notifies the doctor if there is an apparent change in the patient's condition. He must not hesitate to ask the doctor if further explanation is needed. He also must make certain that he understands the order and knows how to carry it out.

(3) Instructing the patient regarding any self-care measures and the time when the patient is to return to the TMC.

(4) Recording the treatment given on SF 600.

(5) Consulting the doctor immediately if:

- The treatment produces unsatisfactory results.
- The patient reacts unfavorably to the treatment.
- The patient desires to see the doctor.

12-23. Emergency Treatment in the Troop Medical Clinic—General Instructions

Emergency medical treatment is the early care given to the wounded, injured, or sick by trained medical personnel. Only some of the general procedures governing initial management of a patient brought to a TMC for emergency care will be discussed. In the TMC situation, a medical specialist will function primarily as the doctor's assistant. If he is the first person to see the patient who has come or been brought to the TMC for emergency treatment, he must know how to do first things first.

a. Preparation for Emergency Care. The specialist should be prepared to receive emergency patients. He should make certain that:

(1) He maintains proficiency in applying the basic ABCD measures of first aid—

- A—Clear the AIRWAY and restore breathing and heartbeat.
- B—Stop the BLEEDING by application of digital pressure to compression points, direct pressure, or pressure dressing to the wound.
- C—Start shock CONTROL measures by maintaining aeration and blood circulation.
- D—Apply a wound DRESSING to protect it from further contamination and control bleeding.

(2) Emergency equipment is ready for use, in its proper location, and immediately available—not locked up.

(3) He knows how to operate all emergency apparatus and how to use all items on an emergency tray. In an emergency, there is no time to look up a technique in a procedure manual, to review an instruction booklet, or to review an SOP.

b. Initial Patient Care Measures. The medical specialist should remember the following instructions:

(1) Do not get excited. Do one thing at a time quickly and efficiently.

(2) Take the patient to an examining or treatment area. Assist the patient to lie down with his head level. If he has been carried on a stretcher or litter, do not move him from the stretcher. Unless he is having difficulty in breathing, keep him lying down with his head level until the doctor gives other instructions. If he is having breathing difficulty, he may be more comfortable with the head of the stretcher elevated to support him in a semisitting position.

(3) Find out what is wrong. Observe the patient. Ask him if he is in pain and, if so, where he hurts. This brief questioning will help to determine his state of consciousness.

(4) Look for signs of breathing difficulty, bleeding, shock, or poisoning. Treatment of these conditions takes precedence over everything else because they are life-endangering.

(5) Notify the doctor immediately, giving a brief, accurate description of the nature of the emergency and the patient's condition.

(6) Take and record vital signs.

(7) Loosen and remove enough of the patient's clothing to enable the doctor to examine the patient, back and front. Handle the patient gently to avoid injury. If it is necessary to cut his clothing, ask for his permission or for that of an accompanying relative, if possible. Cut clothing along seams, if practicable, so that it can be repaired.

(8) Assist the doctor as needed, obtaining any equipment and carrying out all orders quickly and accurately.

c. Follow-up Measures.

(1) Assure the patient's relatives or other concerned individuals who have brought the patient to the TMC that care is being given. Request them to remain in a designated area in the TMC waiting room until the doctor can see them. Make them as comfortable as possible.

(2) Handle the patient's personal possessions as carefully as possible. Safeguard money, identification papers, and other valuables, following the SOP. If eyeglasses, dentures, a hearing aid, or other prosthetic appliances are removed from the patient, handle as if they were valuables.

(3) If other patients are waiting for care, explain briefly why their care is delayed.

(4) Plan to review and discuss the emergency situation with the doctor and other TMC personnel afterward—how it was handled, what deficiencies were noted, and what must be done to improve the handling of future emergencies.

12-24. Accident Reporting

a. Installation commanders are authorized to use a duplicate copy of the sick slip in lieu of DA Form 1051 (Record of Injury) (see AR 385-10) in cases of nonbattle injury of Army active duty military personnel for whom sick slips are ordinarily prepared. The individual initiating the sick slip will check the "Injury" box at the top of the form. Two copies of the form will be initiated for all injury cases, including suspected poisoning cases. After the medical officer's section of the form has been completed, the second copy of the slip will be forwarded to the safety officer concerned by means of a Memo Routing Slip (OF 41).

b. DA Form 1051 is initiated in three copies by the supervisor of the individual concerned, and delivered by the patient, if possible, to the TMC or first aid station. After the medical officer or medical attendant has completed his section of the form, distribution is made as follows: first copy returned to supervisor; second copy retained by medical treatment facility; third copy forwarded to safety officer concerned.