

CHAPTER 4

FIRST AID FOR FRACTURES

INTRODUCTION

A fracture is any break in the continuity of a bone. Fractures can cause total disability or in some cases death. On the other hand, they can most often be treated so there is complete recovery. A great deal depends upon the first aid the individual receives before he is moved. First aid includes immobilizing the fractured part in addition to applying lifesaving measures. *The basic splinting principle is to immobilize the joints above and below any fracture.*

4-1. Kinds of Fractures

See figure 4-1 for detailed illustration.

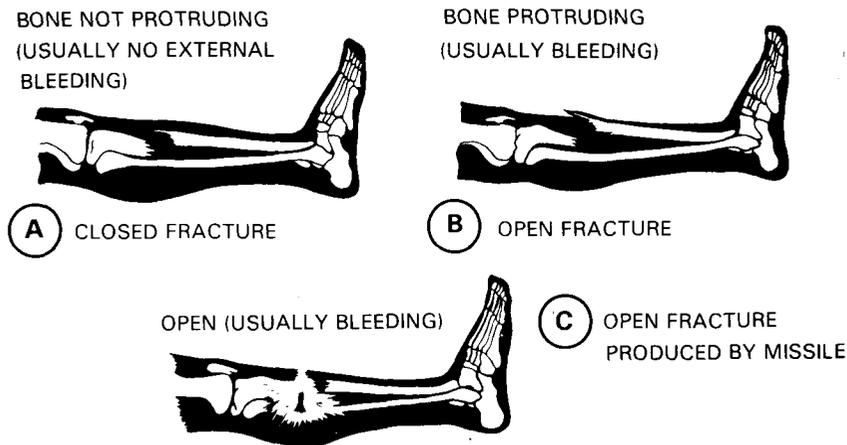


Figure 4-1. Kinds of fractures (Illustrated A thru C).

a. **Closed Fracture.** A closed fracture is a broken bone that does not break the overlying skin. Tissue beneath the skin may be damaged. A *dislocation* is when a joint, such as a knee, ankle, or shoulder, is not in proper position. A *sprain* is when the connecting tissues of the joints have been torn. *Dislocations* and *sprains* should be treated as *closed fractures*.

b. **Open Fracture.** An open fracture is a broken bone that breaks (pierces) the overlying skin. The broken bone may come through the skin,

or a missile such as a bullet or shell fragment may go through the flesh and break the bone. An open fracture is contaminated and subject to infection.

4-2. Signs/Symptoms of Fractures (081-831-1000)

Indications of a fracture are deformity, tenderness, swelling, pain, inability to move the injured part, protruding bone, bleeding, or discolored skin at the injury site. A sharp pain when the individual attempts to move the part is also a sign of a fracture. DO NOT encourage the casualty to move the injured part in order to identify a fracture since such movement could cause further damage to surrounding tissues and promote shock. If you are not sure whether a bone is fractured, treat the injury as a fracture.

4-3. Purposes of Immobilizing Fractures

A fracture is immobilized to prevent the sharp edges of the bone from moving and cutting tissue, muscle, blood vessels, and nerves. This reduces pain and helps prevent or control shock. In a closed fracture, immobilization keeps bone fragments from causing an open wound and prevents contamination and possible infection. *Splint to immobilize.*

4-4. Splints, Padding, Bandages, Slings, and Swathes (081-831-1034)

a. Splints. Splints may be improvised from such items as boards, poles, sticks, tree limbs, rolled magazines, rolled newspapers, or cardboard. If nothing is available for a splint, the chest wall can be used to immobilize a fractured arm and the uninjured leg can be used to immobilize (to some extent) the fractured leg.

b. Padding. Padding may be improvised from such items as a jacket, blanket, poncho, shelter half, or leafy vegetation.

c. Bandages. Bandages may be improvised from belts, rifle slings, bandoleers, kerchiefs, or strips torn from clothing or blankets. Narrow materials such as wire or cord should not be used to secure a splint in place.

d. Slings. A sling is a bandage (or improvised material such as a piece of cloth, a belt, and so forth) suspended from the neck to support an upper extremity. Also, slings may be improvised by using the tail of a coat or shirt, and pieces torn from such items as clothing and blankets. The triangular bandage is ideal for this purpose. Remember that the casualty's hand should be higher than his elbow, and the sling should be applied so that the supporting pressure is on the uninjured side.

e. *Swathes.* Swathes are any bands (pieces of cloth, pistol belts, and so forth) that are used to further immobilize a splinted fracture. Triangular and cravat bandages are often used as or referred to as swathe bandages. The purpose of the swathe is to immobilize, therefore, the swathe bandage is placed above and/or below the fracture—not over it.

4-5. Procedures for Splinting Suspected Fractures (081-831-1034)

Before beginning first aid treatment for a fracture, gather whatever splinting materials are available. Materials may consist of splints, such as wooden boards, branches, or poles. Other splinting materials include padding, improvised cravats, and/or bandages. Ensure that splints are long enough to immobilize the joint above and below the suspected fracture. If possible, use at least four ties (two above and two below the fracture) to secure the splints. The ties should be nonslip knots and should be tied away from the body on the splint.

★ a. *Evaluate the Casualty (081-831-1000).* Be prepared to perform my necessary lifesaving measures. Monitor the casualty for development of conditions which may require you to perform necessary basic lifesaving measures. These measures include clearing the airway, rescue breathing, preventing shock, and/or bleeding control.

WARNING (081-831-1000)

Unless there is immediate life-threatening danger, such as a fire or an explosion, DO NOT move the casualty with a suspected back or neck injury. Improper movement may cause permanent paralysis or death.

WARNING (081-831-1000)

In a chemical environment, DO NOT remove any protective clothing. Apply the dressing/splint over the clothing.

b. *Locate the Site of the Suspected Fracture.* Ask the casualty for the location of the injury. *Does he have any pain? Where is it tender? Can he move the extremity?* Look for an unnatural position of the extremity. Look for a bone sticking out (protruding).

c. *Prepare the Casualty for Splinting the Suspected Fracture (081-831-1034).*

C 2, FM 21-11

(1) Reassure the casualty. Tell him that you will be taking care of him and that medical aid is on the way.

(2) Loosen any tight or binding clothing.

(3) Remove all the jewelry from the casualty and place it in the casualty's pocket. Tell the casualty you are doing this because if the jewelry is not removed at this time and swelling occurs later, further bodily injury can occur.

NOTE

Boots should not be removed from the casualty unless they are needed to stabilize a neck injury, or there is actual bleeding from the foot.

d. Gather Splinting Materials (081-831-1034). If standard splinting materials (splints, padding, cravats, and so forth) are not available, gather improvised materials. Splints can be improvised from wooden boards, tree branches, poles, rolled newspapers or magazines. Splints should be long enough to reach beyond the joints above and below the suspected fracture site. Improvised padding, such as a jacket, blanket, poncho, shelter half, or leafy vegetation may be used. A cravat can be improvised from a piece of cloth, a large bandage, a shirt, or a towel. Also, to immobilize a suspected fracture of an arm or a leg, parts of the casualty's body may be used. For example, the chest wall may be used to immobilize an arm; and the uninjured leg may be used to immobilize the injured leg.

NOTE

If splinting material is not available and suspected fracture CANNOT be splinted, then swathes, or a combination of swathes and slings can be used to immobilize an extremity.

e. Pad the Splints (081-831-1034). Pad the splints where they touch any bony part of the body, such as the elbow, wrist, knee, ankle, crotch, or armpit area. Padding prevents excessive pressure to the area.

f. Check the Circulation Below the Site of the Injury (081-831-1034).

(1) Note any pale, white, or bluish-gray color of the skin which may indicate impaired circulation. Circulation can also be checked

by depressing the toe/fingernail beds and observing how quickly the color returns. A slower return of pink color to the injured side when compared with the uninjured side indicates a problem with circulation. Depressing the toe/fingernail beds is a method to use to check the circulation in a dark-skinned casualty.

(2) Check the temperature of the injured extremity. Use your hand to compare the temperature of the injured side with the uninjured side of the body. The body area below the injury may be colder to the touch indicating poor circulation.

(3) Question the casualty about the presence of numbness, tightness, cold, or tingling sensations.

WARNING

Casualties with fractures to the extremities may show impaired circulation, such as numbness, tingling, cold and/or pale to blue skin. These casualties should be evacuated by medical personnel and treated as soon as possible. Prompt medical treatment may prevent possible loss of the limb.

WARNING

If it is an open fracture (skin is broken; bone(s) may be sticking out), DO NOT ATTEMPT TO PUSH BONE(S) BACK UNDER THE SKIN. Apply a field dressing to protect the area. See Task 081-831-1016, *Put on a Field or Pressure Dressing*.

g. Apply the Splint in Place (081-831-1034).

(1) Splint the fracture(s) in the position found. DO NOT attempt to reposition or straighten the injury. If it is an open fracture, stop the bleeding and protect the wound. (See Chapter 2, Section II, for detailed information.) Cover all wounds with field dressings before applying a splint. Remember to use the casualty's field dressing, not your own. If bones are protruding (sticking out), DO NOT attempt to push them back under the skin. Apply dressings to protect the area.

(2) Place one splint on each side of the arm or leg. Make sure that the splints reach, if possible, beyond the joints above and below the fracture.

(3) Tie the splints. Secure each splint in place *above* and *below* the fracture site with improvised (or actual) cravats. Improvised cravats, such as strips of cloth, belts, or whatever else you have, may be used. With minimal motion to the injured areas, place and tie the splints with the bandages. *Push cravats through and under the natural body curvatures (spaces), and then gently position improvised cravats and tie in place. Use nonslip knots. Tie all knots on the splint away from the casualty (Figure 4-2). DO NOT tie cravats directly over suspected fracture/dislocation site.*

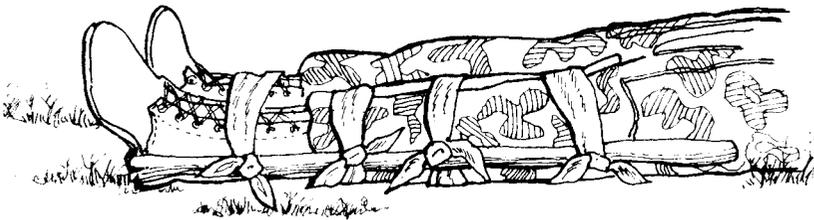


Figure 4-2. Nonslip knots tied away from casualty.

h. Check the Splint for Tightness (081-831-1034).

(1) Check to be sure that bandages are tight enough to securely hold splinting materials in place, but not so tight that circulation is impaired.

(2) Recheck the circulation after application of the splint. Check the skin color and temperature. This is to ensure that the bandages holding the splint in place have not been tied too tightly. A finger tip check can be made by inserting the tip of the finger between the wrapped tails and the skin.

(3) Make any adjustment without allowing the splint to become ineffective.

i. Apply a Sling if Applicable (081-831-1034). An improvised sling may be made from any available nonstretching piece of cloth, such as a fatigue shirt or trouser, poncho, or shelter half. Slings may also be improvised using the tail of a coat, belt, or a piece of cloth from a blanket or some clothing. See Figure 4-3 for an illustration of a shirt tail used for

support. A pistol belt or trouser belt also may be used for support (Figure 4-4). A sling should place the supporting pressure on the casualty's uninjured side. The supported arm should have the hand positioned slightly higher than the elbow.



Figure 4-3. Shirt tail used for support.



Figure 4-4. Belt used for support.

(1) Insert the splinted arm in the center of the sling (Figure 4-5).



Figure 4-5. Arm inserted in center of improvised sling.

(2) Bring the ends of the sling up and tie them at the side (or hollow) of the neck on the uninjured side (Figure 4-6).



Figure 4-6. Ends of improvised sling tied to side of neck.

(3) Twist and tuck the corner of the sling at the elbow (Figure 4-7).

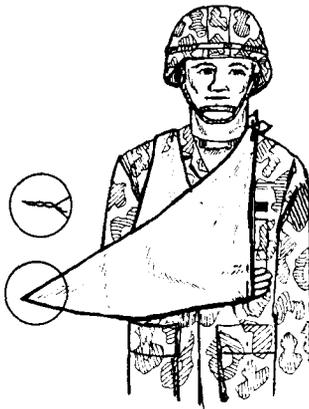


Figure 4-7. Corner of sling twisted and tucked at elbow.

j. Apply a Swathe if Applicable (081-831-1034). You may use any large piece of cloth, such as a soldier's belt or pistol belt, to improvise a swathe. A swathe is any band (a piece of cloth) or wrapping used to further immobilize a fracture. When splints are unavailable, swathes, or a combination of swathes and slings can be used to immobilize an extremity.

WARNING (081-831-1034)

The swathe should not be placed directly on top of the injury, but positioned either above and/or below the fracture site.

(1) Apply swathes to the injured arm by wrapping the swathe over the injured arm, around the casualty's back and under the arm on the uninjured side. Tie the ends on the uninjured side (Figure 4-8).



Figure 4-8. Arm immobilized with strip of clothing.

(2) A swathe is applied to an injured leg by wrapping the swathe(s) around both legs and securing it on the uninjured side.

k. Seek Medical Aid. Notify medical personnel, watch closely for development of life-threatening conditions, and if necessary, continue to evaluate the casualty.

4-6. Upper Extremity Fractures (081-831-1034)

Figures 4-9 through 4-16 show how to apply slings, splints, and cravats (swathes) to immobilize and support fractures of the upper extremities. *Although the padding is not visible in some of the illustrations, it is always preferable to apply padding along the injured part for the length of the splint and especially where it touches any bony parts of the body.*



METHOD 1



METHOD 2

Figure 4-9. Application of triangular bandage to form sling (two methods).

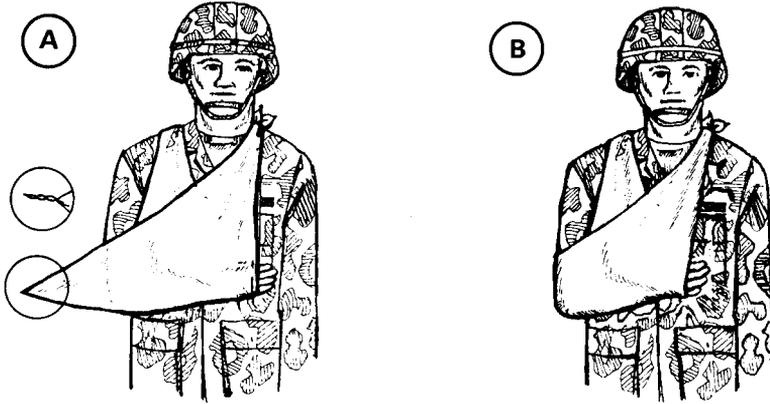


Figure 4-10. Completing sling sequence by twisting and tucking the corner of the sling at the elbow (Illustrated A and B).

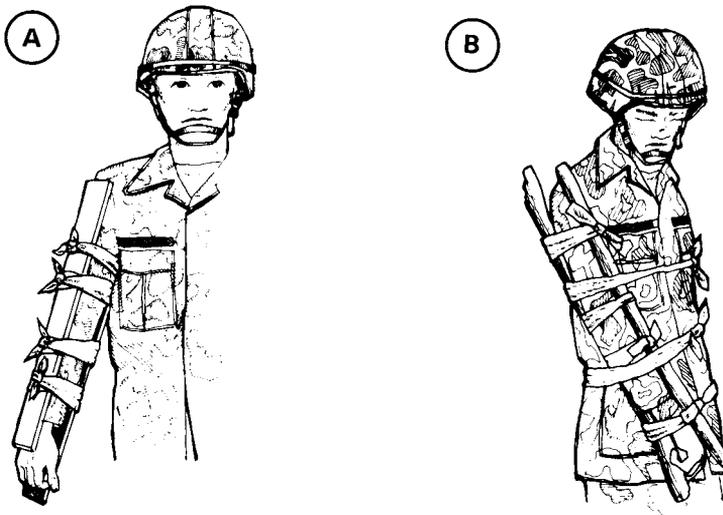


Figure 4-11. Board splints applied to fractured elbow when elbow is not bent (two methods) (081-831-1034) (Illustrated A and B).

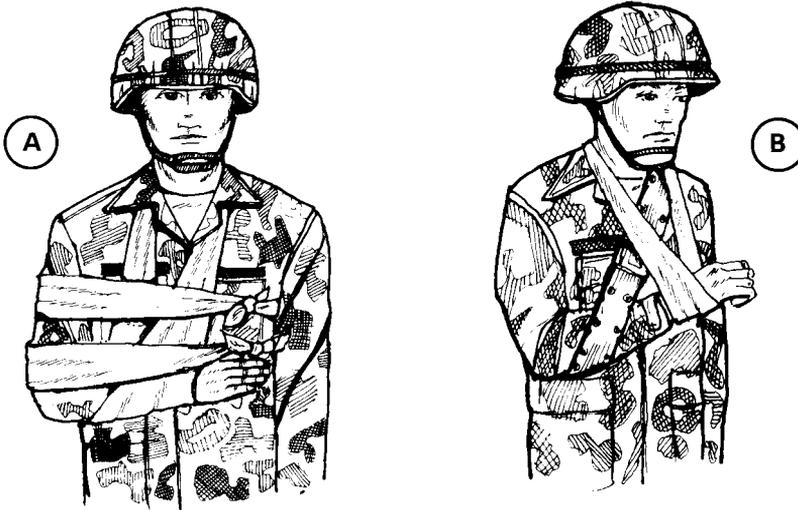


Figure 4-12. Chest wall used as splint for upper arm fracture when no splint is available (Illustrated A and B).

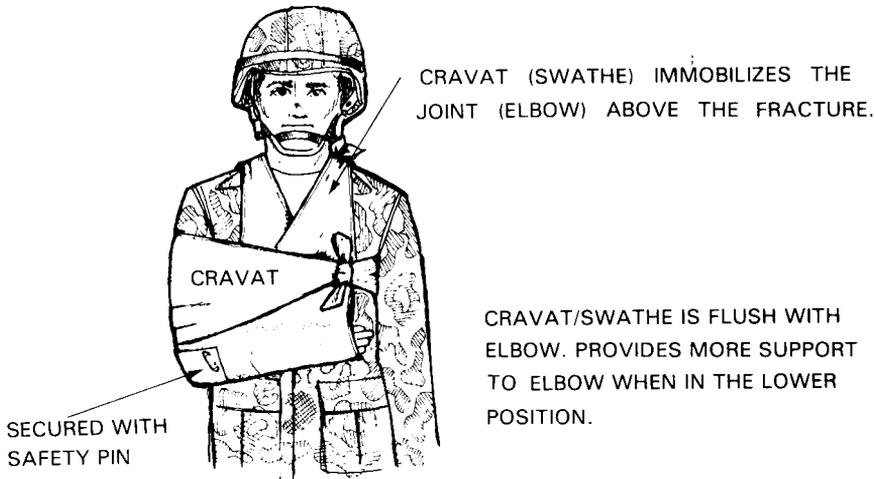


Figure 4-13. Chest wall, sling, and cravat used to immobilize fractured elbow when elbow is bent.

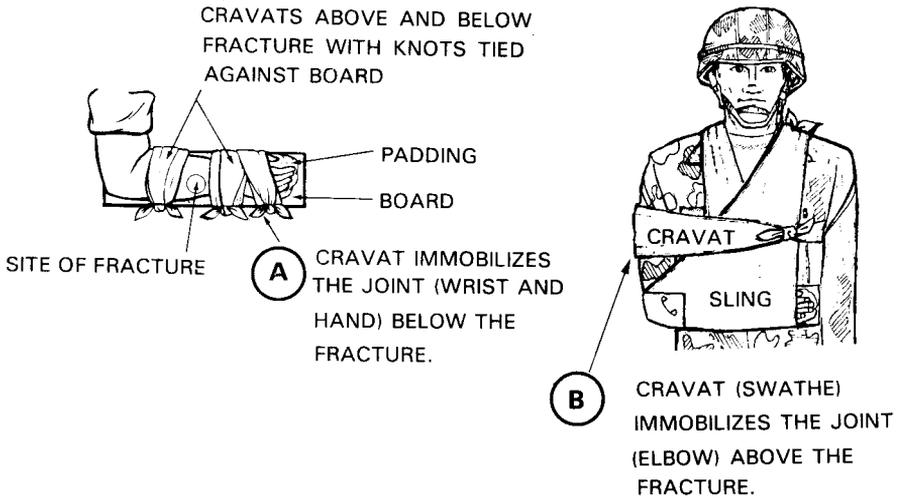


Figure 4-14. Board splint applied to fractured forearm (Illustrated A and B).

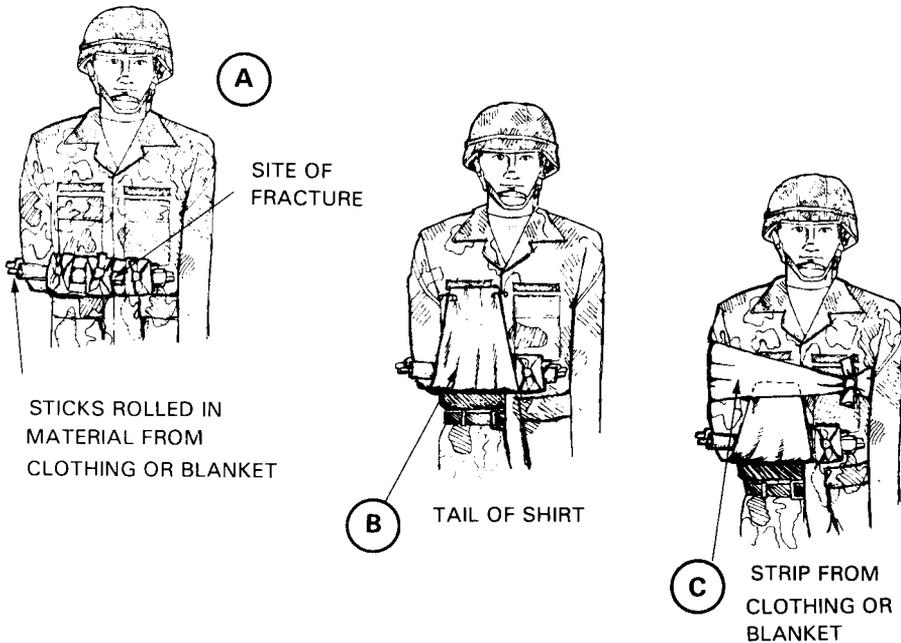


Figure 4-15. Fractured forearm or wrist splinted with sticks and supported with tail of shirt and strips of material (Illustrated A thru C).

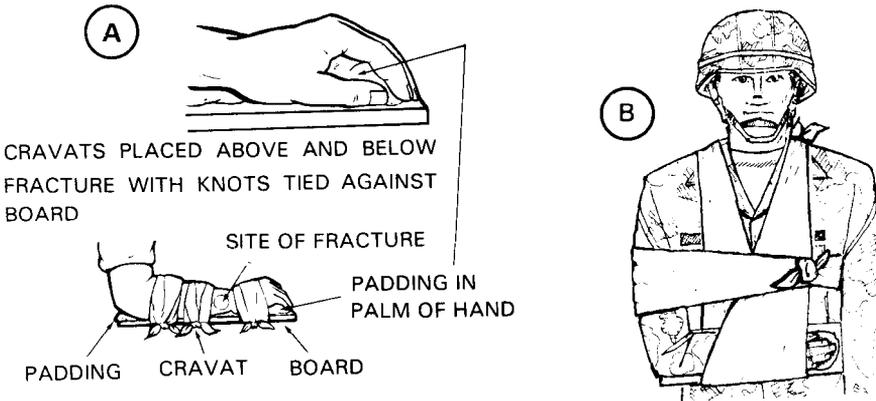


Figure 4-16. Board splint applied to fractured wrist and hand (Illustrated A thru C).

4-7. Lower Extremity Fractures (081-831-1034)

Figures 4-17 through 4-22 show how to apply splints to immobilize fractures of the lower extremities. *Although padding is not visible in some of the figures, it is preferable to apply padding along the injured part for the length of the splint and especially where it touches any bony parts of the body.*

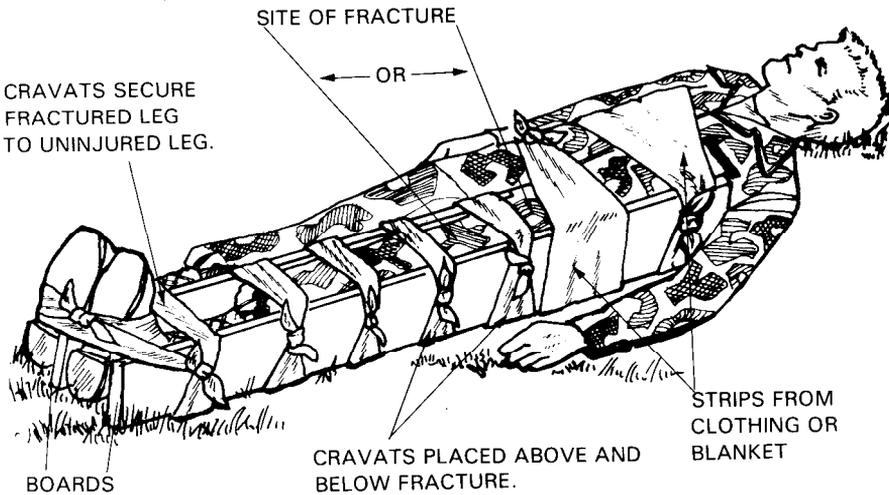
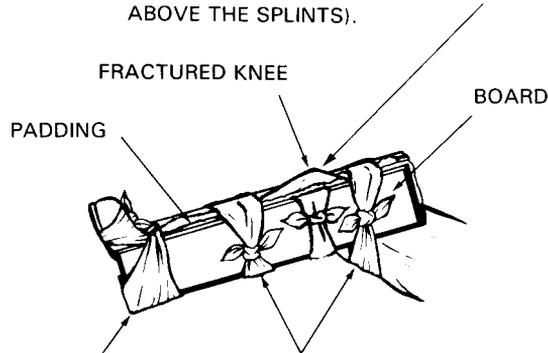


Figure 4-17. Board splint applied to fractured hip or thigh (081-831-1034).

CRAVAT CRADLES KNEE: CRAVAT IS PLACED AROUND THE SPLINT, BETWEEN THE BOARDS, UNDER THE KNEE, THUS CRADLING THE KNEE (THE KNEE PROTRUDES ABOVE THE SPLINTS).

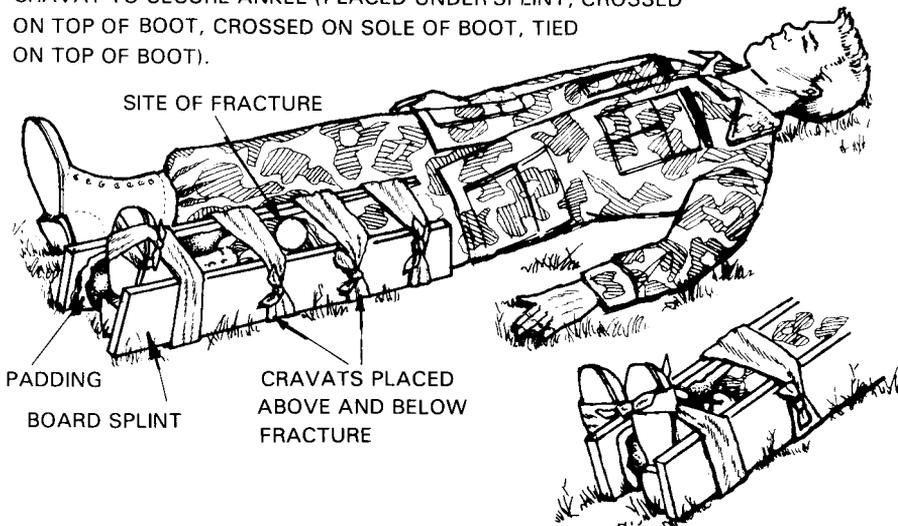


CRAVAT TO SECURE ANKLE (CUPPED UNDER HEEL, CROSSED ON TOP OF BOOT, CROSSED ON SOLE OF BOOT, TIED ON TOP OF BOOT).

CRAVATS PLACED ABOVE AND BELOW FRACTURE. KNOTS TIED AGAINST BOARD.

Figure 4-18. Board splint applied to fractured or dislocated knee (081-831-1034).

CRAVAT TO SECURE ANKLE (PLACED UNDER SPLINT, CROSSED ON TOP OF BOOT, CROSSED ON SOLE OF BOOT, TIED ON TOP OF BOOT).



CRAVAT TO SECURE FRACTURED LEG TO OTHER LEG (IF MORE SUPPORT IS NEEDED).

Figure 4-19. Board splint applied to fractured lower leg or ankle.

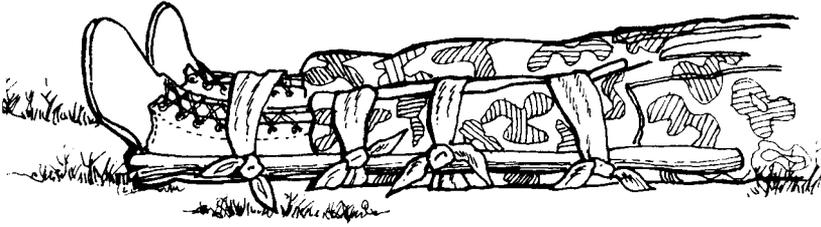
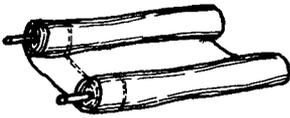
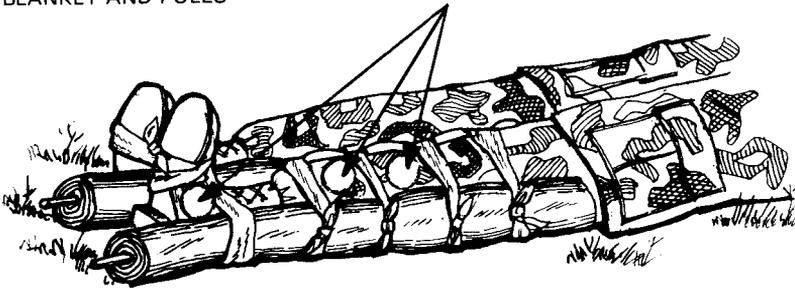


Figure 4-20. *Improvised splint applied to fractured lower leg or ankle.*



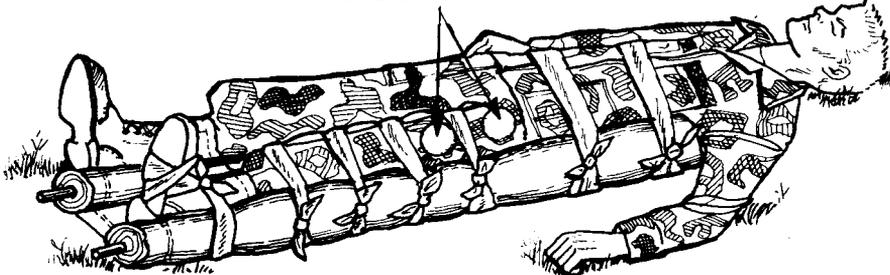
BLANKET AND POLES

SITE OF FRACTURE



SPLINT APPLIED FOR FRACTURED LOWER LEG, KNEE OR ANKLE

SITE OF FRACTURE



SPLINT APPLIED FOR FRACTURED THIGH OR HIP

Figure 4-21. *Poles rolled in a blanket and used as splints applied to fractured lower extremity.*

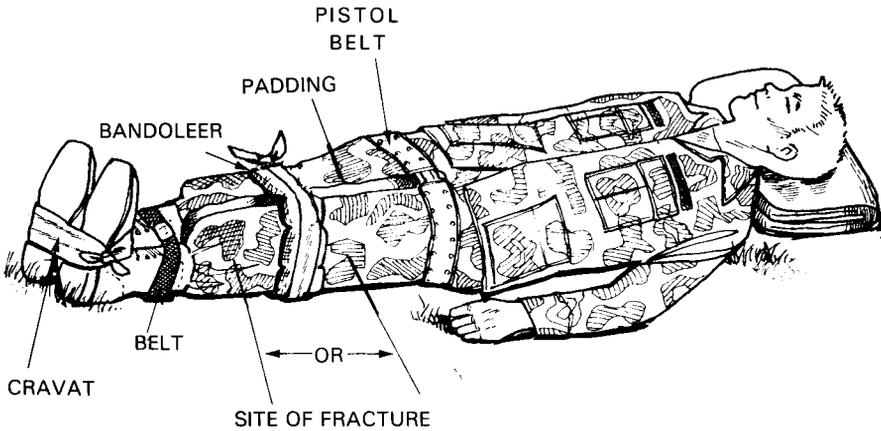


Figure 4-22. Uninjured leg used as splint for fractured leg (anatomical splint).

4-8. Jaw, Collarbone, and Shoulder Fractures

a. Apply a cravat to immobilize a fractured jaw as illustrated in Figure 4-23. Direct all bandaging support to the top of the casualty's head, not to the back of his neck. If incorrectly placed, the bandage will pull the casualty's jaw back and interfere with his breathing.

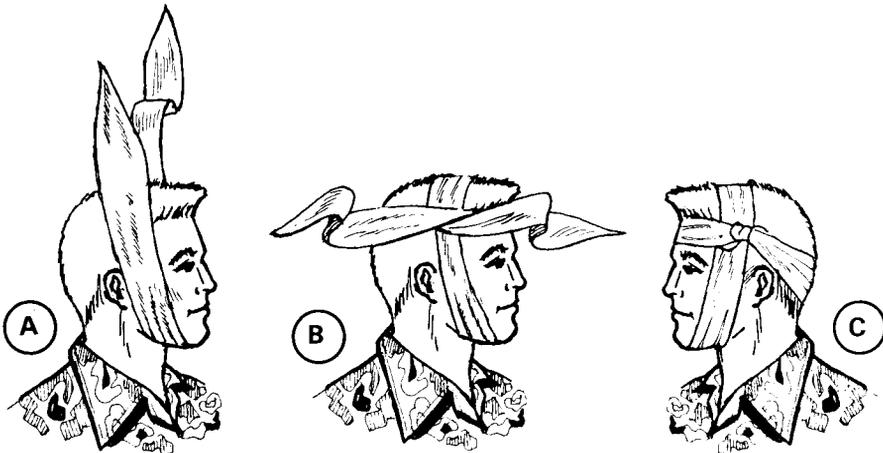


Figure 4-23. Fractured jaw immobilized (Illustrated A thru C).

CAUTION

Casualties with lower jaw (mandible) fractures cannot be laid flat on their backs because facial muscles will relax and may cause an airway obstruction.

b. Apply two belts, a sling, and a cravat to immobilize a fractured collarbone, as illustrated in Figure 4-24.

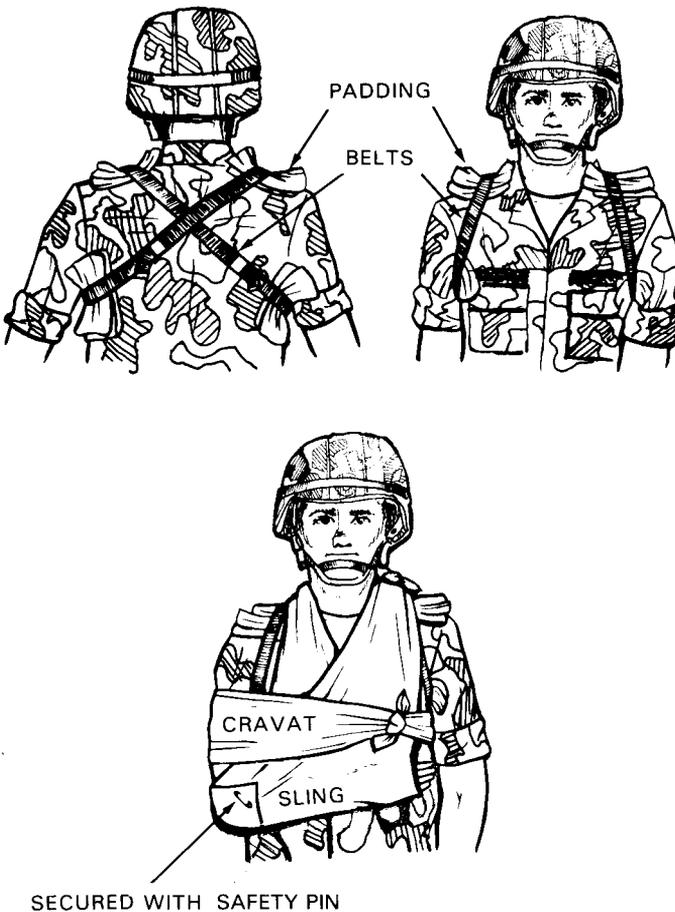


Figure 4-24. Application of belts, sling, and cravat to immobilize a collarbone.

c. Apply a sling and a cravat to immobilize a fractured or dislocated shoulder, using the technique illustrated in Figure 4-25.

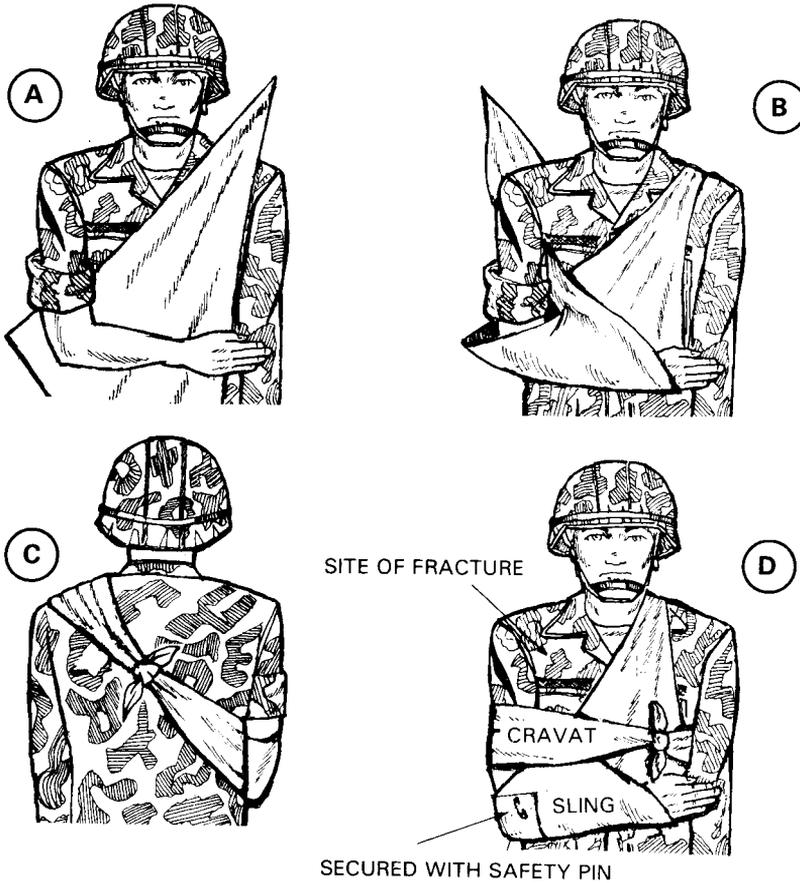


Figure 4-25. Application of sling and cravat to immobilize a fractured or dislocated shoulder (Illustrated A thru D).

4-9. Spinal Column Fractures (081-831-1000)

It is often impossible to be sure a casualty has a fractured spinal column. Be suspicious of any back injury, especially if the casualty has fallen or if his back has been sharply struck or bent. If a casualty has received such an injury and does not have feeling in his legs or cannot move them, you can be reasonably sure that he has a severe back injury which should be

treated as a fracture. Remember, if the spine is fractured, bending it can cause the sharp bone fragments to bruise or cut the spinal cord and result in permanent paralysis (Figure 4-26A). The spinal column must maintain a swayback position to remove pressure from the spinal cord.

a. If the Casualty Is Not to Be Transported (081-831-1000) Until Medical Personnel Arrive—

- Caution him not to move. Ask him if he is in pain or if he is unable to move any part of his body.

- Leave him in the position in which he is found. **DO NOT** move any part of his body.

- Slip a blanket, if he is lying face up, or material of similar size, under the arch of his back to support the spinal column in a swayback position (Figure 4-26 B). If he is lying face down, **DO NOT** put anything under any part of his body.

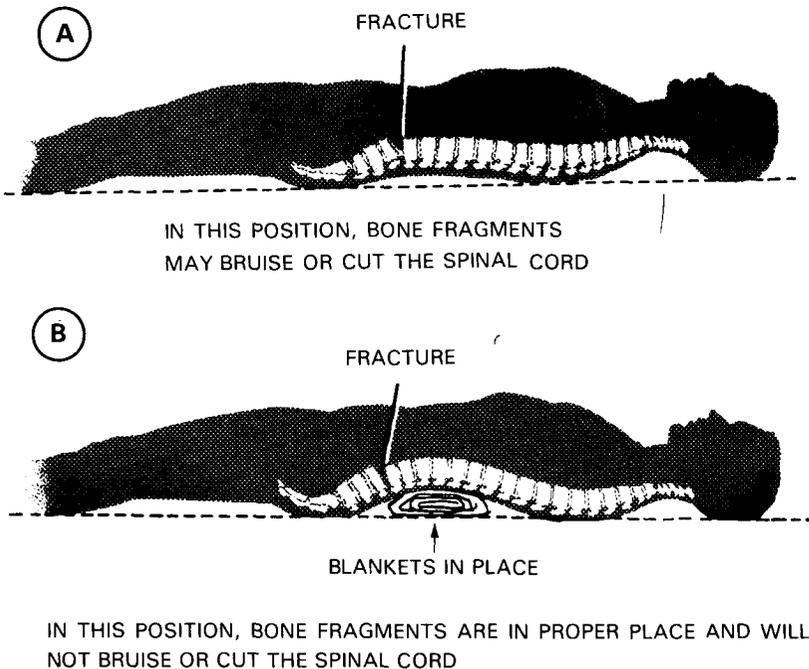


Figure 4-26. Spinal column must maintain a swayback position (Illustrated A and B).

b. If the Casualty Must Be Transported to A Safe Location Before Medical Personnel Arrive—

● And if the casualty is in a face-up position, transport him by litter or use a firm substitute, such as a wide board or a flat door longer than his height. Loosely tie the casualty's wrists together over his waistline, using a cravat or a strip of cloth. Tie his feet together to prevent the accidental dropping or shifting of his legs. Lay a folded blanket across the litter where the arch of his back is to be placed. Using a four-man team (Figure 4-27), place the casualty on the litter without bending his spinal column or his neck.



Figure 4-27. Placing face-up casualty with fractured back onto litter.

o The number *two*, *three*, and *four* men position themselves on one side of the casualty; all kneel on one knee along the side of the casualty. The number one man positions himself to the opposite side of the casualty. The number *two*, *three*, and *four* men gently place their hands under the casualty. The number one man on the opposite side places his hands under the injured part to assist.

o When all four men are in position to lift, the number *two* man commands, "PREPARE TO LIFT" and then, "LIFT." All men, in unison, gently lift the casualty about 8 inches. Once the casualty is lifted, the number *one* man *recovers* and *slides* the litter under the casualty, ensuring that the blanket is in proper position. The number *one* man then returns to his original lift position (Figure 4-27).

o When the number *two* man commands, "LOWER CASUALTY," all men, in unison, gently lower the casualty onto the litter.

● And if the casualty is in a face-down position, he must be transported in this same position. The four-man team lifts him onto a regular or improvised litter, keeping the spinal column in a swayback position. If a regular litter is used, first place a folded blanket on the litter at the point where the chest will be placed.

4-10. Neck Fractures (081-831-1000)

A fractured neck is extremely dangerous. Bone fragments may bruise or cut the spinal cord just as they might in a fractured back.

a. If the Casualty Is Not to Be Transported (081-831-1000) Until Medical Personnel Arrive—

- Caution him not to move. Moving may cause death.
- Leave the casualty in the position in which he is found. If his neck/head is in an abnormal position, *immediately* immobilize the neck/head. Use the procedure stated below.

o Keep the casualty's head still, if he is lying face up, raise his shoulders slightly, and slip a roll of cloth that has the bulk of a bath towel under his neck (Figure 4-28). The roll should be thick enough to arch his neck only slightly, leaving the back of his head on the ground. DO NOT bend his neck or head forward. DO NOT raise or twist his head.

Immobilize the casualty's head (Figure 4-29). Do this by padding heavy objects such as rocks or his boots and placing them on each side of his head. If it is necessary to use boots, first fill them with stones, gravel, sand, or dirt and tie them tightly at the top. If necessary, stuff pieces of material in the top of the boots to secure the contents.

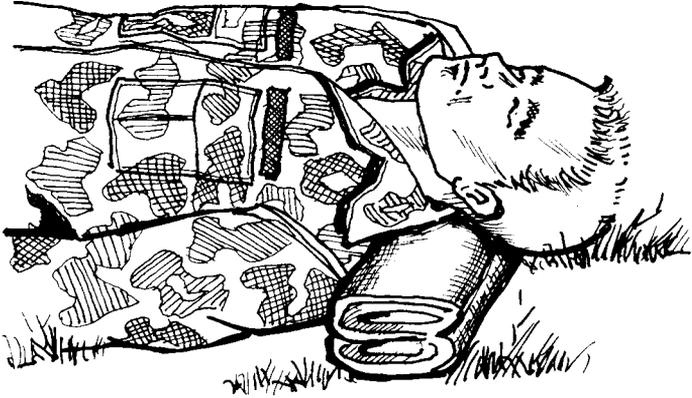


Figure 4-28. Casualty with roll of cloth (bulk) under neck.

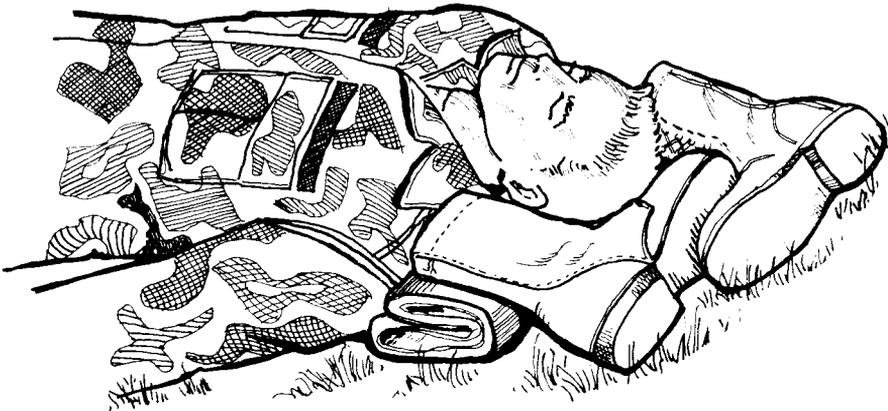


Figure 4-29. Immobilization of fractured neck.

o DO NOT move the casualty if he is lying face down. Immobilize the head/neck by padding heavy objects and placing them on each side of his head. DO NOT put a roll of cloth under the neck. DO NOT bend the neck or head, nor roll the casualty onto his back.

b. If the Casualty Must be Prepared for Transportation Before Medical Personnel Arrive—

- And he has a fractured neck, at least two persons are needed because the casualty's head and trunk must be moved in unison. The two persons must work in close coordination (Figure 4-30) to avoid bending the neck.

- Place a wide board lengthwise beside the casualty. It should extend at least 4 inches beyond the casualty's head and feet (Figure 4-30 A).

- If the casualty is lying *face up*, the number *one* man steadies the casualty's head and neck between his hands. At the same time the number *two* man positions one foot and one knee against the board to prevent it from slipping, grasps the casualty underneath his shoulder and hip, and gently slides him onto the board (Figure 4-30 B).

- If the casualty is lying *face down*, the number *one* man steadies the casualty's head and neck between his hands, while the number *two* man gently rolls the casualty over onto the board (Figure 4-30 C).

- The number *one* man continues to steady the casualty's head and neck. The number *two* man simultaneously raises the casualty's shoulders slightly, places padding under his neck, and immobilizes the casualty's head (Figures 4-30 D, and E). The head may be immobilized with the casualty's boots, with stones rolled in pieces of blanket, or with other material.

- Secure any improvised supports in position with a cravat or strip of cloth extended across the casualty's forehead and under the board (Figure 4-30 D).

- Lift the board onto a litter or blanket in order to transport the casualty (Figure 4-30 E).

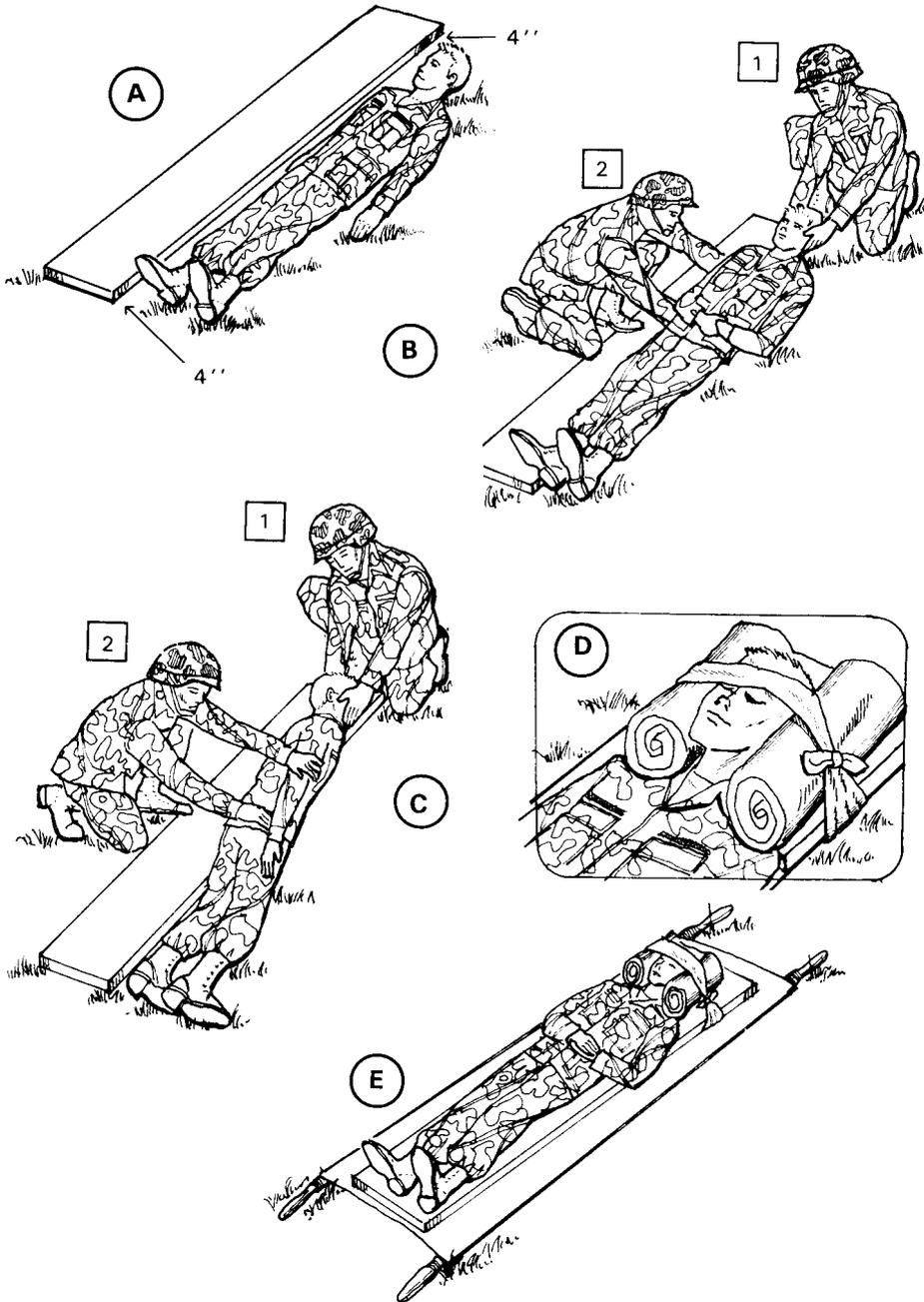


Figure 4-30. Preparing casualty with fractured neck for transportation (Illustrated A thru E).

NOTES