COMBAT LIFESAVER / TACTICAL COMBAT CASUALTY CARE STUDENT HANDOUT

“THE BEST FORM OF TROOP WELFARE IS TOUGH, REALISTIC TRAINING”

REVISED MARCH 2010

RANK/NAME:_____

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TACTICAL COMBAT CASUALTY CARE/COMBAT LIFESAVER OVERVIEW

LEARNING OBJECTIVES.

a. **TERMINAL LEARNING OBJECTIVE**

1. Without the aid of references, identify Tactical Combat Casualty Care, per the stated references. (CLS####)

b. **ENABLING LEARNING OBJECTIVES**

1. Without the aid of references, given a description or list, identify the history of Tactical Combat Casualty Care, per PHTLS Manual, current edition. (CLS####)

2. Without the aid of references, given a description or list, identify the factors influencing Tactical Combat Casualty Care/Combat Lifesaver, per PHTLS Manual, current edition. (CLS####)

3. Without the aid of references, given a description or list, identify the objectives of Tactical Combat Casualty Care/Combat Lifesaver, per PHTLS Manual, current edition. (CLS####)

4. Without the aid of references, given a description or list, identify the phases of care that apply to Tactical Combat Casualty Care/Combat Lifesaver, per PHTLS Manual, current edition. (CLS####)

5. Without the aid of references, given a description or list, identify the Combat Lifesaver medical gear, per PHTLS Manual, current edition. (CLS####)

1. **HISTORY OF TCCC**

a. It is important to realize that civilian trauma care in a non-tactical setting is dissimilar to trauma care in a combat environment. TCCC and CLS are an attempt to better prepare medical and non-medical personnel for the unique factors associated with combat trauma casualties.

b. Historical data shows that 90% of combat wound fatalities die on the battlefield before reaching a military treatment facility. This fact illustrates the importance of first responder care at the point of injury.

c. TCCC was originally a US Special Operations research project which was composed of trauma management guidelines focusing on casualty care at the point of injury.

d. TCCC guidelines are currently used throughout the US Military and various allied countries.

e. TCCC guidelines were first introduced in 1996 for use by Special Operations corpsmen, medics, and pararescumen (PJs).

f. The TCCC guidelines are currently endorsed by the American College of Surgeons, Committee on Trauma and the National Association of Emergency Medical Technicians. The guidelines have been incorporated into the Prehospital Trauma Life Support (PHTLS) text since the 4th edition.

g. The Committee on Tactical Combat Casualty Care (CoTCCC) was established in 2002 by the US Special Operations Command with support from the US Navy Bureau of Medicine and Surgery (BUMED). This multiservice committee is comprised of military and civilian trauma specialists, operational physicians, and combat medical personnel. The CoTCCC is responsible for updating the guidelines based on current civilian and military trauma care, medical research, and combat doctrine.

2. **Factors Influencing TCCC/CLS**

a. Factors affecting combat trauma that demonstrate the dissimilarity from civilian trauma care include taking hostile fire, night operations, resource limitations, varying evacuation times,

varying transportation platforms, extreme environments, mission requirements, and tactical considerations.

b. Three preventable causes of death on the battlefield, see Figure 1:

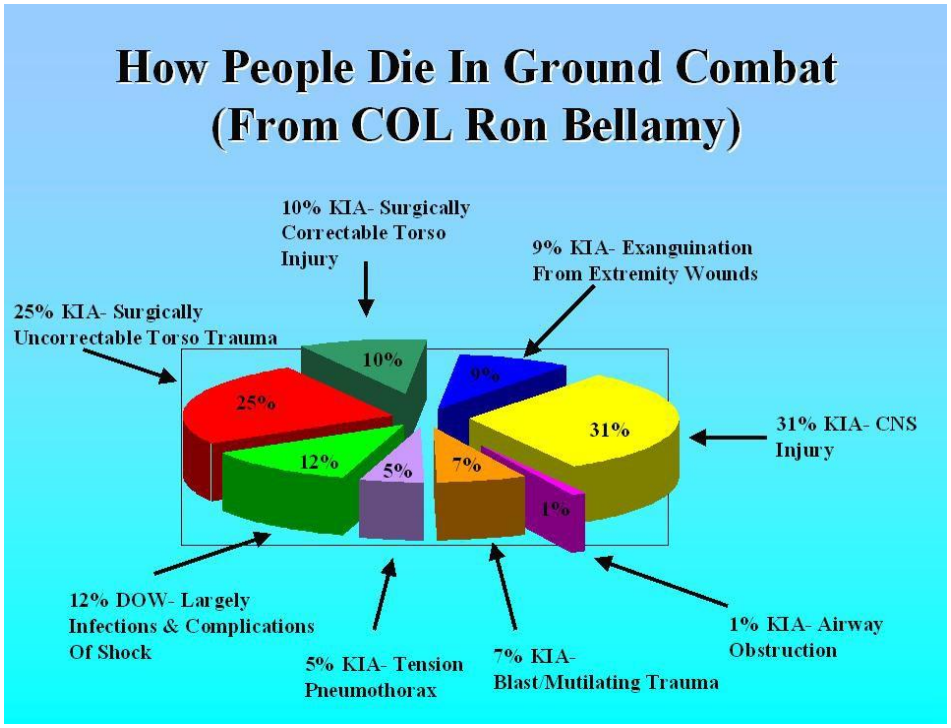


Figure 1

(1) Hemorrhage from extremity wounds, see Figure 2

Figure 2

(2) Tension pneumothorax, see Figure 3

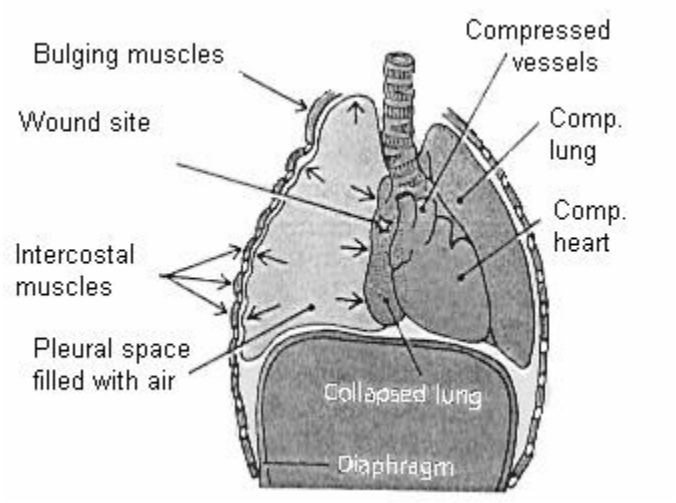


Figure 3

(3) Airway compromise, see Figure 4

Figure 4

3. **<u>Objectives of TCCC/CLS</u>**

a. Treat the casualty – Following the TCCC/CLS systematic approach to gain fire superiority, move, assess, treat, and evacuate the casualty.

b. Prevent additional casualties – Continued fire superiority, performing the correct intervention at the correct time.

c. Complete the mission – Mission accomplishment is paramount but the number and severity of casualties may require a contingency plan be considered.

4. **TCCC/CLS Phases of Care**

a. The 3 phases of CLS care during hostile engagements focus on eliminating threats first, then focusing on casualty management.

(1) Care Under Fire

(a) The casualty and CLS at the point of injury taking effective hostile fire with equipment limitations.

(b) CoTCCC 2009 Updates – If tactically feasible apply tourniquet proximal to the bleeding site, over the uniform, tighten, and move the casualty to cover.

(2) Tactical Field Care

(a) The casualty and CLS are no longer taking effective hostile fire or casualty sustains injury without hostile fire. Equipment limitations are still an issue. Consider TACEVAC.

(c) CoTCCC 2009 Updates – If casualty presents with torso trauma and progressive respiratory distress, consider needle decompression to treat a tension pneumothorax. Preferred needle/catheter is 14g 3.25inches. Apply occlusive material to cover sucking chest wound and combat gauze is the hemostatic agent of choice.

(d) CoTCCC 2009 Updates - Reassess tourniquet and move to direct skin, 2-3 inches from wound, distal pulse check, tighten or apply another tourniquet if necessary. Expose and clearly mark tourniquet time.

(e) CoTCCC 2009 Updates - Penetrating eye trauma, assess visual acuity, cover with rigid shield 400mg Moxifloxacin from pill pack. Document on casualty card.

(3) Tactical Evacuation Care

(a) Casualty picked up by an aircraft, vehicle or boat. Additional personnel and equipment may be pre-staged for continued casualty care.

1 Encompasses both Casualty Evacuation (CASEVAC) and Medical Evacuation (MEDEVAC).

(b) Updates 2009 same as tactical field care phase.

(c) CASEVAC: (e.g. FEBA to BAS) Medical Care is limited by tactical and resource constraints to basic interventions. Movement from forward edge of battle area, aircraft may be exposed to hostile fire.

(d) MEDEVAC: From one point of care to another in theater.

(e) AEROMEDICAL EVACUATION: (e.g. CSH to Regional Medical Center) from within theater to more rearward location.

5. **Combat Lifesaver Medical Gear**

a. All Marines are issued an Individual First Aid Kit (IFAK), see Figure 5. The casualty's IFAK should be used by the CLS for initial treatment. Therefore it is important for CLS Marines to have a thorough understanding of the items in the IFAK to assist with casualty care.

*Note – See Appendix B for a full list of IFAK contents.

Figure 5

b. In addition to a personal IFAK, CLS Marines will be issued a CLS Kit, see Figure 6. The CLS kit contains similar items to the IFAK in addition to specific medical tools to be used only by the CLS, which will be discussed throughout this course. This kit should be utilized to augment the casualty's IFAK contents during casualty care.

*Note – See Appendix A for a full list of CLS Kit contents.

Figure 6

REFERENCES

PHTLS Manual, current edition

Notes

IDENTIFY MEDICAL FUNDAMENTALS

1. **LEARNING OBJECTIVES**.

   a. **TERMINAL LEARNING OBJECTIVE**. Without the aid of references, given a description or list, identify basic medical fundamentals, within 80% accuracy, per the stated references. (CLS####)

   b. **ENABLING LEARNING OBJECTIVES**

      (1) Without the aid of references, given a description or list, identify the basic anatomy of the body, within 80% accuracy, per the NAVEDTRA 14295. (CLS####)

      (2) Without the aid of references, given a description or list, identify vital body functions, within 80% accuracy, per the MCRP 3-02G and NAVEDTRA 14295. (CLS####)

      (3) Without the aid of references, given a description or list, identify abnormal vital body functions, within 80% accuracy, per the MCRP 3-02G. (CLS####)

1. **ANATOMY OF THE BODY**:

Overview - Knowledge of how the human body is constructed and how it works is an important part of the training of everyone concerned with healing the sick or managing conditions following injuries. The human body is a combination of organ systems, with a supporting framework of muscles and bones and an external covering of skin.

a. **THE MUSCLE/SKELETAL SYSTEM**

(1) The skeleton is the bony framework of the body and is composed of 206 bones. It supports and gives shape to the body; protects vital organs; and provides sites of attachment for tendons, muscles, and ligaments. The skeletal bones are joined members that make muscle movement possible. (See Figure-1)

(2) Axial Skeleton - The axial skeleton consists of the skull, spinal column and rib cage.

(3) Appendicular Skeleton - The appendicular skeleton consists of the bones of the upper extremities which include the scapula, bones of the lower extremities, and the pelvic girdle.

(a) The upper extremities are made up of the humerus, ulna, radius and bones of the wrist & hand.

(b) The lower extremities are made up of the femur, tibia, fibula, patella and bones that make up the ankles & feet.

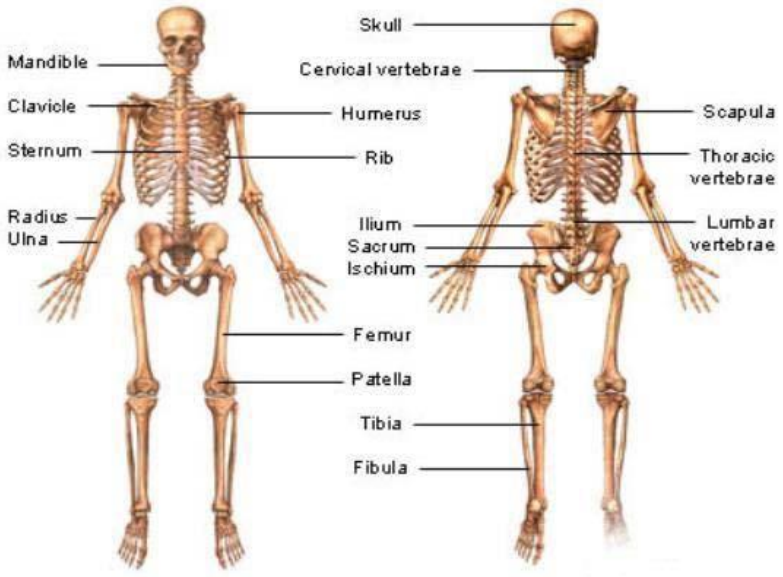


Figure – 1 Skeletal System

(4) Muscles are responsible for many different types of body movements. The action of the muscle is determined mainly by the kind of joint it is associated with and the way the muscle is attached to the joint. Muscle seldom act alone, they usually working in groups to provide movement.

2. **VITAL BODY FUNCTIONS**

Overview - In order for the service member to learn to perform first aid procedures, he must have a basic understanding of what the vital body functions are and what the result will be if they are damaged or not functioning.

a. Conscious or unconscious casualty. The **AVPU scale** (**A**lert, **V**oice, **P**ain, **U**nresponsive) is a system by which the CLS can measure and record a patient's level of consciousness.

(1) Alert - a fully awake (although not necessarily orientated) casualty. This casualty will have spontaneously open eyes, will respond to voice (although may be confused) and will have bodily motor function.

(2) Voice - the patient makes some kind of response when you talk to them, which could be in any of the three component measures of Eyes, Voice or Motor. (e.g. patient's eyes open on being asked "are you

okay?"). The response could be as little as a grunt, moan, or slight move of a limb when prompted by the voice of the CLS.

(3) Pain - the casualty makes a response on any of the three component measures when pain stimulus is used on them.

(a) Sternal rub, where the CLS's knuckles are firmly rubbed on the breastbone of the casualty. A fully conscious casualty would normally locate the pain and push it away; however, a casualty who is not alert and who has not responded to is likely to exhibit only withdrawal from pain, or even involuntary flexion or extension of the limbs from the pain stimulus.

(b) Brachial pinch – here the CLS pinches the Brachial area of the causality to stimulate pain.

(4) Unresponsive - this outcome is recorded if the casualty does not give any Eye, Voice or Motor response to voice or pain.

b. Breathing Process. All humans must have oxygen to live. Through the breathing process, the lungs draw oxygen from the air and put it into the blood. The heart pumps the blood through the body to be used by the cells that require a constant supply of oxygen. Some cells are more dependent on a constant supply of oxygen than others. For example, cells of the brain may die within 4 to 6 minutes without oxygen. Once these cells die, they are lost forever since they do not regenerate. This could result in permanent brain damage, paralysis, or death.

c. Respiration. Respiration occurs when a person inhales (oxygen is taken into the body) and then exhales (carbon dioxide [CO2] is expelled from the body). Respiration involves the airway, the lungs, and diaphragm. (See Figure-2)

(1) Airway. The airway consists of the nose, mouth, throat, voice box, and windpipe. It is the canal through which air passes to and from the lungs.

(2) Lungs. The lungs are two elastic organs made up of thousands of tiny air spaces and covered by an airtight membrane. The bronchial tree is a part of the lungs.

(3) Diaphragm. The diaphragm is a large dome-shaped muscle that separates the lungs from the abdominal cavity. This muscle, which is controlled by the brain, regulates the breathing cycle.

(a) Respiration rate refers to the number of breathes per minute. The normal breathing rate is about 12 to 20 breaths per minute.

(b) Respiration rhythm refers to the manner in which a person breathes. Respiration rhythm is classified as regular or irregular. A regular rhythm is when the interval between breaths is constant, and an irregular rhythm is when the interval between breaths varies.

(c) Respiration depth refers to the amount of air moved between each breath. Respiration depth is classified as normal, deep, or shallow.

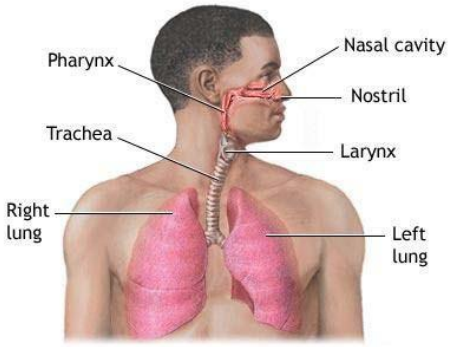


Figure – 2 Respiratory System

d. **Blood Circulation**. The heart and the blood vessels (arteries, veins, and capillaries) circulate blood through the body tissues. The heart is divided into two separate halves, each acting as a pump. (See Figure – 3)

(1) The left side pumps oxygenated blood (bright red) through the arteries into the capillaries.

(2) The right side receives low oxygenated blood (dark

red) from the capillaries where it returns it to the lungs to be re-oxygenated.

(3) The heart contracts, forcing the blood from its chambers; then it relaxes, permitting its chambers to refill with blood. This is know as the heartbeat, which is normally 60 to 80 beats per minute.

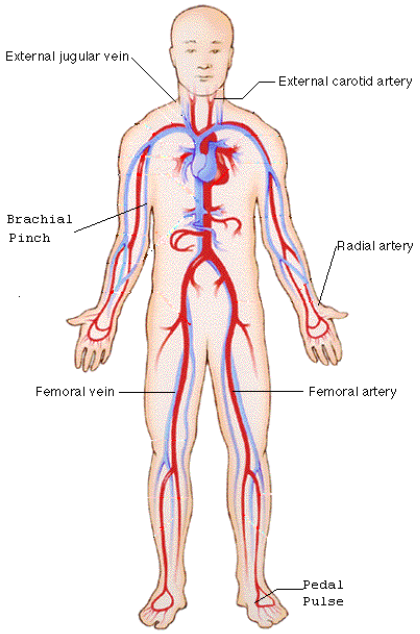


Figure – 3 Circulatory System

(4) The heart expands and contracts forcing blood through the arteries and veins in a pulsating manner. This cycle of expansion and contraction can be felt (monitored) at various points in the body and is called the *pulse.* The common points for checking the pulse are at the side of the neck (*carotid)*, groin (*femoral*), and wrist(*radial*).

(a) To check the carotid pulse, feel for a pulse on the side of the casualty's neck closest to you. This is done by placing the tips of your first two fingers beside his/her throat. (See Figure- 4)

Figure – 4 Carotid Pulse

(b) To check the femoral pulse, press the tips of your first two fingers into the middle of the groin. (See Figure - 5)

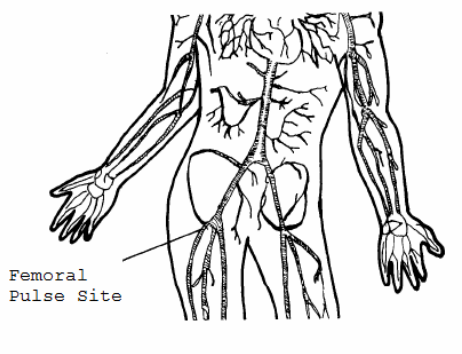


Figure – 5 Femoral Pulse

(c) To check the radial pulse, place your first two fingers on the thumb side of the casualty's wrist. (See Figure - 6)

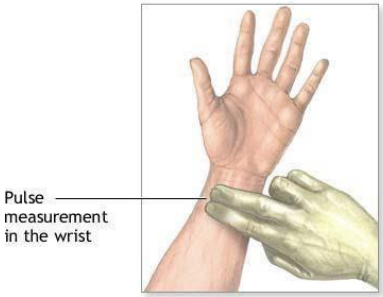


Figure – 6 Radial Pulse

Note: DO NOT use your thumb to check a casualty's pulse because you may confuse the beat of the CLS's pulse with that of the casualty.

(5) Palpated Blood Pressure

(a) To determine a casualty's blood pressure in a combat environment the CLS should use the palpated blood method. This systematic approach utilizes the casualty's arterial pulse to get an estimated systolic blood pressure. The CLS must work from the furthest point away from the heart to get the highest blood pressure. (e.g. radial first, femoral second, carotid third)

1 Find the radial pulse – if present, casualty has a systolic blood pressure of at least 80 mmHg. This is verbalized as "80 over palp" and documented as 80/P.

2 If the casualty has no radial pulse, attempt to find the femoral pulse – if present, casualty has a systolic blood pressure of at least 70mmHG. This is verbalized as "70 over palp" and documented as 70/P.

3 If the casualty has no femoral pulse, attempt to find the carotid pulse – if present, the casualty has a systolic blood pressure of at least 60mmHg. This is verbalized as "60 over palp" and documented as 60/P.

(6) Skin

(a) Color - Adequate perfusion produces a pinkish hue to the skin. Skin becomes pale when blood is shunted away from an area. Bluish coloration indicates incomplete oxygenation. Examination of the nail beds and mucous membranes serves to overcome the difference in skin pigments. Changes in color first appear in lips, gums or fingertips. (e.g. pink, pale, red)

(b) Temperature – is influenced by environmental conditions. Cool skin indicates decreased perfusion, regardless of cause. (e.g. warm, cool)

(c) Condition – dry skin indicates good perfusion. Moist skin is associated with shock and decreased perfusion. (e.g. moist, dry)

(7) Capillary Refill Time – check by pressing over the nail beds. This is a tool in estimating blood flow through the most distal part of the circulation. Should be less than 3 seconds. Greater than 3 Seconds indicate a potential circulatory problem.

3. **ABNORMAL BODY FUNCTIONS**

a. **Lack of Oxygen**. Human life cannot exist without a continuous intake of oxygen. Lack of oxygen rapidly leads to death. First aid involves knowing how to open the airway and restore breathing. CLS providers have 4 to 6 minutes to provide an adequate airway.

b. **Life-Threatening Hemorrhage (Bleeding)**. Human life cannot continue without an adequate volume of blood circulating through the body to carry oxygen to the tissues. An important first aid measure is to stop the bleeding to prevent the loss of blood. CLS providers have 60-120 seconds to stop the massive life- threatening hemorrhage.

c. **Shock**. Shock means there is an inadequate blood flow to the vital tissues and organs. Shock that remains uncorrected may result in death even though the injury or condition causing the shock would not otherwise be fatal. Shock can result from many causes, such as loss of blood, loss of fluid from deep burns, pain, and reaction to the sight of a wound or blood. First aid includes preventing shock, since the casualty's chances of survival are much greater if he does not develop shock.

d. **Infection**. The objective is to keep wounds clean and free of organisms. A good working knowledge of basic first aid measures also includes knowing how to dress a wound to avoid infection or additional contamination.

REFERENCES:

MCRP 3-02G
NAVEDTRA 14295

Notes

MANAGE HEMORRHAGE

1. **LEARNING OBJECTIVES**.

   a. **TERMINAL LEARNING OBJECTIVE**. Without the aid of references, given a description or list, manage hemorrhage, within 80% accuracy, per the stated references. (CLS####)

   b. **ENABLING LEARNING OBJECTIVES**

      (1) Without the aid of references, given a description or list, identify the types of hemorrhage, within 80% accuracy, per the PHTLS Manual, current edition. (CLS####)

      (2) Without the aid of references, given a list of symptoms, identify hemorrhage control materials, within 80% accuracy, per the PHTLS Manual, current edition and MCRP 3-02G. (CLS####)

      (3) Without the aid of references, given a description or list, identify the treatment for life-threatening hemorrhage, within 80% accuracy, per the PHTLS Manual, current edition and MCRP 3-02G. (CLS####)

      (4) Without the aid of references, given a description or list, identify the treatment for non-life threatening hemorrhage, within 80% accuracy, per the PHTLS Manual, current edition and MCRP 3-02G. (CLS####)

      (5) Without the aid of references, given a casualty, apply a tourniquet to prevent further injury or death, per the PHTLS Manual, current edition. (CLS####)

      (6) Without the aid of references, given a casualty, apply hemostatic agents to prevent further injury or death, per the PHTLS Manual, current edition. (CLS####)

OVERVIEW

Historically, 20 percent of all injured combatants die on the battlefield. Of the battlefield casualties who die, approximately 65 percent will die of massive, multi-system trauma and are probably not salvageable. On the basis of data found from the Vietnam conflict, almost 50% of battlefield casualties died of hemorrhage (bleeding out) within 3 to 5 minutes and could have been salvaged with timely intervention.

Extremity hemorrhage is the most frequent cause of PREVENTABLE deaths on the battlefield.

These wounds may be fatal within minutes. In a combat environment, the treatment of a life-threatening hemorrhage is the first priority. This is because the brain can go 4 to 6 minutes without oxygen before permanent brain damage occurs.
Once hemorrhage is controlled, the establishment of the airway once again becomes the primary concern AFTER the casualty has been moved to a safer setting, as in the Tactical Field Care phase of TCCC.

1. **HEMORRHAGE**

Hemorrhage is defined as blood escaping from arteries, veins or capillaries. The heart pushes oxygen rich blood through the arteries and into the capillaries where oxygen is dropped off and carbon dioxide is picked up. Once that exchange has taken place, the blood is then pushed into the veins back into the heart. The heart sends that blood to the lungs where it picks up more oxygen and then continues that cycle.

a. **Types of Hemorrhage**

(1) Arterial. If an artery near the surface is cut, BRIGHT RED BLOOD will gush out in spurts that are synchronized with the heartbeat.

(2) Venous. Blood from the veins is DARK RED. Venous bleeding is characterized by a steady, even flow.

(3) Capillary. Capillary blood is usually BRICK RED in color. If capillaries bleed, the blood oozes out slowly.

(4) Life Threatening. Any arterial bleed is life threatening. Some venous bleeds are considered life threatening based off of how much blood is being lost and how quickly.

(5) Non-Life Threatening. Slow venous bleeds and capillary bleeds.

(6) Extremity. Bleeding from the arms, hands, legs or feet.

(7) Non-Extremity. Bleeding from head, neck, chest, back, abdomen, or pelvis.

2. **HEMORRHAGE CONTROL MATERIALS**

a. **Dressings**. Either a commercially manufactured absorbent material or improvised materials used to cover and protect wounds from further injury, infection, or physical contamination.

(1) Purpose:

(a) Promote hemorrhage control.

(b) Protect the wound from further injury.

(c) Immobilize soft tissue wounds (large wounds).

(d) Protect the wound from further external contamination.

(e) Provide physical and psychological support to the patient.

(2) Types:

(a) Cinch Tight:

1 Medium to Large battle dressing

2 Combined with a 4 inch ace wrap

3 Metal "S" hook for pressure application

(b) "H" Bandage:

1 Medium to Large battle dressing

2 Combined with a 4 inch ace wrap

3 Plastic "H" hook for pressure application

b. **Bandages** A piece of gauze either commercially manufactured or improvised. It can be applied to wrap or bind a body part or dressing.

(1) Purpose:

(a) Hold dressings and splints in place.

(b) Provides additional pressure to the dressing or splint.

(c) Protects the dressing.

(2) Types:

(a) Kerlex:

1 Advantages

a Extremely absorbent

b Weave of material makes roll stretchable without elastic.

c Sterile

d Good for packing cavities when used as a dressing.

2 Disadvantages

a Looses bulk when wet

b Catches debris and snags very easily

(b) Ace wrap:

1 Advantages:

a Can be applied quickly

b Gives pressure to the entire wound area

c Provides excellent support for sprains and strains.

2 Disadvantages:

a Can decrease peripheral circulation.

(c) Cravats or Triangular Bandages (40”x40”x56”):

1 Advantages:

a The most versatile bandage made. Called by some the workhorse of the aid bag.

b Comes in small packages with safety pins.

c Can be used as a tourniquet.

2 Disadvantages:

a Has very little absorbency potential.

(d) Expedient (Improvised) Dressings and Bandage:

1 Patients clothing.

2 Patients equipment.

3 The only limitations are on the CLS’s imagination.

3. **TREATMENT OF LIFE-THREATENING HEMORRHAGE**

a. Apply direct pressure to the wound with your gloved hand.

b. Extremity wounds:

(1) Treatment of a **life-threatening extremity wound** is to apply a tourniquet.

c. Non-extremity wounds:

(1) Pressure Dressing

(2) Hemostatic Agent

(3) Monitor for shock

(4) Evacuate to medical personnel

d. Tourniquets:

Used to control life-threatening extremity hemorrhage.

(1) Use the Combat Application Tourniquet (CAT) if available (See Figure 1).

(a) Tourniquet of choice

(b) Lightweight

(c) Easy to apply

(d) Easy to use

(e) Place 2-3 inches above the wound

(f) Place tourniquet over casualty's clothing

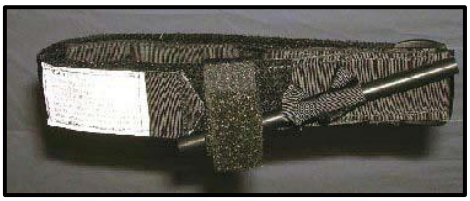


Figure – 1 CAT

(2) If the CAT is not available, make and utilize an improvised tourniquet (See Figure 2).

(a) Choose a material about 2" wide. The new CLS bag and the IFAK contain triangular bandages that can be conformed into a cravat. Material such as rope, wire and string should not be used because they can cut into flesh.

(b) Tie a strong windless into a cravat or other strong material.

(c) Slide one or two strong rings, such as grenade pin rings, on each side of the cravat.

(d) Tie the cravat around the affected limb two (2) to three (3) inches above the wound loosely. (This will allow the windless to turn creating circumferenial pressure to stop the bleed).

(e) Twist the windless until the hemorrhage is controlled.

(f) Slide the ring onto the windless and secure windless to the rings.

(3) Tourniquet Rules:

(a) Never place a tourniquet on a joint (knee, elbow).

(b) Document placement of a tourniquet by placing a "**T**" and the time on the casualty's forehead.

(c) Do not cover a tourniquet under any condition. Leave it exposed (over the uniform) for open viewing.

(d) Apply a second tourniquet proximal to the first to ensure hemorrhage control.

(4) Tourniquet Mistakes:

(a) Not using one when you should

(b) Using one when you shouldn't

(c) Putting it on too close to wound

(d) Not tight enough

(e) Removing the tourniquet. ONLY medical

personnel are allowed to remove a tourniquet once it is in place!

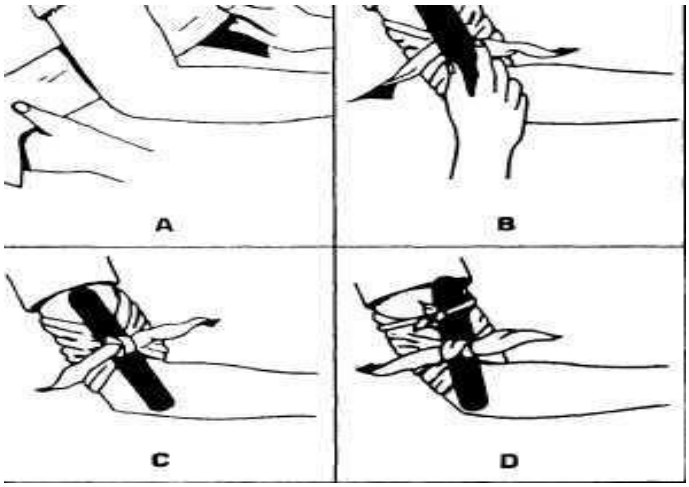


Figure – 2 Improvised Tourniquet

e. Hemostatic agent:

(1) Purpose - When applied to a wound, causes the wound to develop a clot that will stop the flow of blood and will remain within the wound until removed by medical personnel.

(2) Combat Gauze - Has been recommended as the hemostatic agent of choice due to its increased ability to stop bleeding. Other previous hemostatic agents (Quickclot, HemCon, etc.) have been removed from the guidelines as a result of concerns about its safety.

(a) Combat Gauze (See Figure 3)

1 How it Works:

a Combat Gauze is a 3x4 inch roll of sterile gauze that is impregnated with kaolin, which helps promote blood clotting.

b Unlike Quickclot, Combat Gauze is **not** exothermic (heat producing) in nature.

c The combination of sterile gauze and proprietary inorganic material allows Combat Gauze to be non-allergenic.

2 Application Procedures:

a Expose wound and identify bleeding.

b If possible, remove any excess blood that is pooling in or around the wound.

c Pack wound tightly and directly on the source of bleeding. If multiple Combat Gauze rolls are needed, apply as many as necessary to completely pack the wound.

d Apply direct pressure continually for approximately 3 minutes, or until bleeding stops. Reassess wound to ensure bleeding is controlled. Combat Gauze may be repacked or a second gauze used if initial application fails.

e Leave Combat Gauze in place and apply a pressure dressing directly over top of the wound.

f Transport and monitor casualty. **Do not** remove the pressure dressing or the Combat Gauze. Reassess the casualty to ensure bleeding remains controlled.

Figure – 3 Combat Gauze

4. **TREATMENT OF NON-LIFE THREATENING HEMORRHAGE**

a. Apply direct pressure to the wound with your gloved hand

b. Extremity wounds:

(1) Pressure dressing

(2) Hemostatic Agent, used if pressure dressing is ineffective

c. Non-extremity wounds:

(1) Pressure dressing

(2) Hemostatic Agent (if pressure dressing is not effective).

(3) Monitor for shock

(4) Evacuate to medical personnel

d. Pressure dressings: Used to control non-life threatening extremity hemorrhage and/or life threatening non extremity hemorrhage.

(1) When using cravats and battle dressings, must have two (2) dressings and two (2) bandages to be considered a pressure dressing.

(2) The first dressing is placed directly over the bleeding and covered with a bandage. The dressing should cover the entire wound and the bandage should cover the entire dressing. Do not tie the knot of the first bandage directly on the wound. (tie to one of the 4 sides).

(3) The second dressing is made as small and tight as possible and placed over the first dressing/bandage and covered with the second bandage to apply the actual pressure. This knot is tied directly on top of the wound.

(4) If the second dressing becomes saturated, the application of a tourniquet or hemostatic agents may be necessary to control the bleeding.

(5) Cinch tight and "H"-bandage dressings now come in the IFAK and/ or CLS bag. Only one of these dressings is necessary and is more effective than the (2) bandage/dressing pressure dressing.

REFERENCES

PHTLS Manual, current edition
MCRP 3-02G

Notes

MAINTAIN CASUALTY AIRWAY

1. **LEARNING OBJECTIVES**

   a. **TERMINAL LEARNING OBJECTIVE**. Without the aid of references, given a casualty, maintain a casualty's airway, per the stated references. (CLS####)

   b. **ENABLING LEARNING OBJECTIVES**

      (1) Without the aid of references, given a casualty, identify the anatomy of an airway, within 80% accuracy, per the PHTLS Manual, current edition and MCRP 3-02G. (CLS####)

      (2) Without the aid of references, given a casualty, identify an airway emergency, within 80% accuracy, per the PHTLS Manual, current edition and MCRP 3- 02G. (CLS####)

      (3) Without the aid of references, given a casualty, properly position the casualty to assist in ventilations, per the PHTLS Manual, current edition and MCRP 3-02G. (CLS####)

      (4) Without the aid of references, given a casualty, open the airway to prevent obstructions, per the PHTLS Manual, current edition and MCRP 3-02G. (CLS####)

      (5) Without the aid of references, given a casualty, insert a nasopharyngeal airway to maintain a patent airway, per the PHTLS Manual, current edition and MCRP 3-02G. (CLS####)

1. **IDENTIFY THE ANATOMY OF AN AIRWAY**

a. **Anatomical Structures**

(1) The airway consists of the nose, mouth, throat, voice box and wind pipe. It is the canal through which air passes to and from the lungs (Figure 1).

(2) The bronchial tree is the intersection at the bottom of the windpipe where the air is diverted to the right and left lungs (Figure 1).

(3) The lungs are two elastic organs made up of thousands of tiny air spaces and covered by an airtight membrane. The lungs are protected by the rib cage, which is formed by the muscle-connected ribs, which join the spine in the back, and the breastbone in the front (Figure 1).

(4) The top part of the rib cage is closed by the structure of the neck, and the bottom part is separated from the abdominal cavity by a large dome-shaped muscle called the diaphragm (Figure 1).

(5) The diaphragm and rib muscles, which are under the control of the respiratory center in the brain, automatically contract and relax. Contraction increases and relaxation decreases the size of the rib cage. When the rib cage increases and then decreases, the air pressure in the lungs is first less and then more than the atmospheric pressure, thus causing the air to rush into and out of the lungs to equalize the pressure. This cycle of inhaling and exhaling is repeated 12 to 20 times per minute (Figure 1).

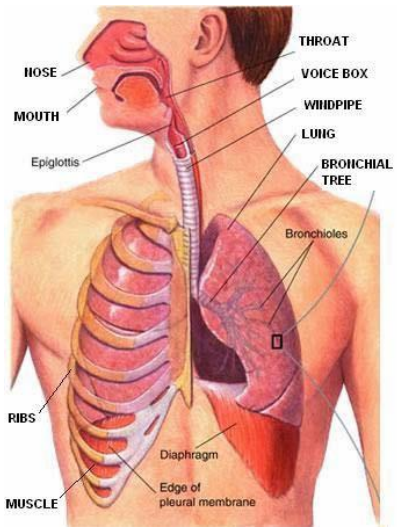


Figure 1. RESPIRATORY SYSTEM

b. **Breathing Process**

(1) All humans must have oxygen to live. Through the breathing process, the lungs draw oxygen from the air and put it into the blood.

(2) The heart pumps the blood through the body to be used by the cells that require a constant supply of oxygen. Some cells are more dependant on a constant supply of oxygen than others. For example, cells of the brain may die within 4 to 6 minutes without oxygen. Once these cells die, they are lost forever since they do not regenerate. This could result in permanent brain damage, paralysis, or death.

c. **Respiration**

(1) Respiration occurs when a person inhales(oxygen is taken into the body) and then exhales(carbon dioxide [CO2] is expelled from the body).

(2) An alteration in normal respiration rate is cause for concern and maybe associated with trauma.

2. **IDENTIFY AN AIRWAY EMERGENCY**

a. **Assess the Casualty**

(1) Check for responsiveness

(a) Establish whether the casualty is conscious by gently shaking him and asking, "Hey Marine, are you OK?"

(b) If he can talk this is a good sign his airway is working, treat as a responsive casualty.

(c) If he does not answer his airway is in doubt, treat as an unresponsive casualty, maintain the airway and call for help.

(2) Common causes of an airway emergency are foreign body airway obstructions like broken teeth, vomit, or other foreign material. The tongue is the most common cause for obstruction in an unconscious patient.

3. **POSITION THE CASUALTY**

a. **Proper Positioning of an Unresponsive Casualty**

(1) Placing a casualty flat on their back is the best position to work on maintaining an airway.

(2) Take care if the casualty is lying on his chest (prone position); you will need to cautiously roll the casualty as a unit so that his body does not twist (which may further complicate a back, neck, or spinal injury).

(3) To position the unresponsive patient so that he is lying on his back and on a firm surface:

(a) Kneel beside the casualty with your knees near his shoulders and check for responsiveness (leave space to roll his body) (Figure 2A).

(b) Call for help (Figure 2B).

(c) Straighten the casualty's legs (Figure 2B).

(d) Take the casualties arm that is nearest to you and move it so that it is straight and above his head. Repeat the procedure for the other arm (Figure 2B).

(e) Place one hand behind his head and neck for support. With your other hand, grasp the casualty under his far arm (Figure 2C).

Figure 2. POSITIONING AN UNRESPONSIVE CASUALTY

b. **Putting the Patient in the Recovery Position**

(1) The correct position is called the "**Lateral Recovery Position**" (figure 3). Start with the victim lying

on the back and with the legs straight out:

(a) Kneel on one side of the victim, facing the victim.

(b) Move the arm closest to you so it is perpendicular to the body, with the elbow flexed (perpendicular).

(c) Move the farthest arm across the body so that the hand is resting across the torso.

(d) Bend the leg farthest from you so the knee is elevated.

(e) Reach inside (preferably the outside of the knee, grasping clothing) the knee to pull the thigh toward you.

(f) Use the other arm to pull the shoulder that is farthest from you.

(g) Roll the body toward you. Leave the upper leg in a flexed position to stabilize the body.

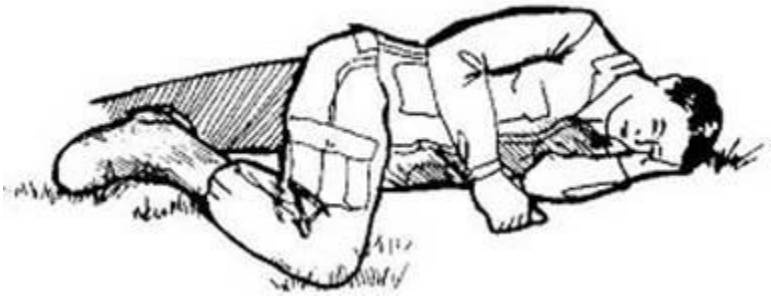


FIGURE 3. LATERAL RECOVERY POSITION

4. **OPEN THE AIRWAY**

a. **Unresponsive/Casualty not breathing**

(1) The tongue is the single most common cause of an airway obstruction (Figure 4).

(2) Extreme caution must be used in combat to open an airway because excessive force may cause spinal injury.

(3) The safest approach to opening the airway is the Jaw Thrust technique or the Trauma Chin Lift because in most cases they can be accomplished without extending the neck.

Figure 4. OBSTRUCTED AIRWAY

b. **Jaw Thrust Technique**

(1) The jaw thrust is the safest/first approach to opening the airway of a casualty who has a suspected neck injury because in most cases it can be accomplished without extending the neck.

(2) The jaw thrust may be accomplished by the rescuer grasping the angles of the casualty's lower jaw and lifting with both hands, one on each side, displacing the jaw forward and up (Figure 5).

(3) The rescuer's elbows should rest on the surface on which the casualty is lying. If the lips close, the lower lip can be retracted with the thumb.

Figure 5. JAW THRUST MANUEVER

c. **Trauma Chin Lift**.

(1) The rescuer will be in a position at the casualty's side between the casualty's shoulder and hips, facing the casualty's head.

(2) With the hand closest to the casualty's feet, the provider grasps the casualty's teeth or the lower part of the jaw between his or her thumb and first two fingers beneath the casualty's chin (Figure 6).

(3) The provider now pulls the casualty's chin anteriorly and slightly toward the feet, elevating the lower part of the jaw and opening the mouth (Figure 6).

Figure 6. TRAUMA CHIN LIFT MANUEVER

d. **Check for Breathing While Maintaining Airway**

(1) After establishing an open airway, it is important to maintain the airway in an open position.

(2) Often the act of just opening and maintaining the airway will allow the casualty to breath properly.

(3) Once a technique to open the airway is used (jaw thrust or trauma chin lift), someone should maintain proper head positioning to keep the airway open.

(4) Failure to maintain an open airway will prevent the casualty from receiving an adequate supply of oxygen.

(5) Therefore, while maintaining an open airway the rescuer should LOOK, LISTEN, and FEEL.

5. **INSERT A NASO-PHARYNGEAL AIRWAY**.

a. **Types of Airway Adjuncts**.

(1) When manual airway maneuvers are unsuccessful at correcting an anatomic airway obstruction, the use of an artificial airway is the next step.

(2) There are various types of airways used for trauma.

(3) The only airway for the Combat Lifesaver is the Nasopharyngeal Airway (NPA).

(4) The NPA (Figure 7) is a soft, latex device that is inserted through one of the nostrils and follows the natural pathway, bypassing any problems that may arise from the tongue blocking the airway. The NPA works well with both conscious and unconscious casualties.

Figure 7. NPA

b. **Indications/Contraindications/Complications**.

(1) The NPA should be used when the casualty is unable to maintain his own airway, and it is a good idea to use one just in case problems develop.

(2) The only time you would not use an NPA is if there is no need for an airway adjunct.

(3) Bleeding caused by insertion is a potential complication.

c. **Proper NPA Use and Placement**.

(1) First, assess the nasal passage for any apparent obstructions (fractures, hemorrhage).

(2) Select the proper size NPA by measuring from the casualty's nose to earlobe.

(3) Lubricate the NPA with a small amount of water based lubricant.

(4) Insert the tip of the NPA into the nostril and direct it back toward the ear using a slight rotating motion until the flange rests against the nostril (Figure 8).

(5) Make sure to reassess for effectiveness once the NPA has been properly placed.

FIGURE 8. NASO-PHARYNGEAL INSERTION

REFERENCES:

PHTLS Manual, current edition
MCRP 3-02G

Notes

MANAGE PENETRATING CHEST INJURIES

1. **LEARNING OBJECTIVES**.

   a. **TERMINAL LEARNING OBJECTIVE**. Without the aid of references, given a description or list, manage penetrating chest injuries, within 80% accuracy, per the stated references. (CLS####)

   b. **ENABLING LEARNING OBJECTIVES**

      (1) Without the aid of references, given a description or list, identify the anatomy of the respiratory system, within 80% accuracy, per the PHTLS Manual, current edition and MCRP 3-02G. (CLS####)

      (2) Without the aid of references, given a description or list, identify the signs and symptoms of a sucking chest wound, within 80% accuracy, per the PHTLS Manual, current edition and MCRP 3-02G. (CLS####)

      (3) Without the aid of references, given a description or list, identify the treatment for a sucking chest wound, within 80% accuracy, per the PHTLS Manual, current edition and MCRP 3-02G. (CLS####)

      (4) Without the aid of references, given a description or list, identify the signs and symptoms of a Tension Pneumothorax, within 80% accuracy, per the PHTLS Manual, current edition and MCRP 3-02G. (CLS####)

      (5) Without the aid of references, given a description or list, identify the treatment for a Tension Pneumothorax, within 80% accuracy, per the PHTLS Manual, current edition and MCRP 3-02G. (CLS####)

      (6) Without the aid of references, given a casualty, perform a needle thoracentesis to relieve a Tension Pneumothorax, per the PHTLS Manual, current edition and MCRP 3-02G. (CLS####)

OVERVIEW

Chest injuries are the second leading cause of trauma deaths each year, although the vast majority of all chest injuries (70% to 85% of penetrating trauma) can be managed without surgery.
Traumatic chest injuries can be caused by a variety of mechanisms, including motor vehicle collisions, falls, sport injuries, crush injuries, stab wounds, and gun shot wounds.
Most often, the organs injured are those that lie along the path of the penetrating object. Tension Pneumothorax is the second leading cause of preventable death on the battlefield

1. **ANATOMY**

a. **Thorax (chest cavity)**: (See Figure-1)

(1) The skeletal portion of the thorax is a bony cage formed by the sternum, costal cartilages, ribs, and the bodies of the thoracic vertebrae.

(2) Ribs connect in the back with the thoracic spine and in the front with the sternum.

(3) A nerve, an artery, and vein are located along the underside of each rib.

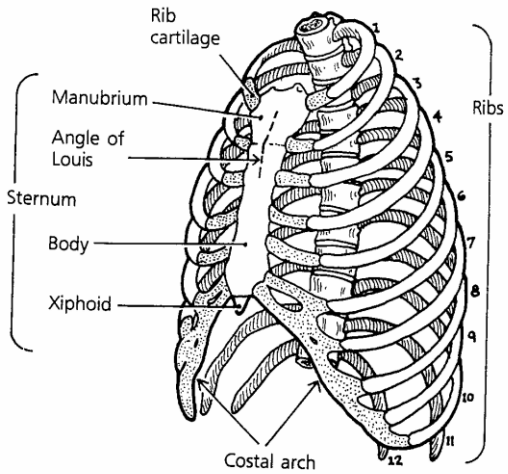


Figure - 1 Thorax

b. **Pleura**: (See Figure-2)

(1) A thin membranous lining that covers an organ.

(a) The parietal pleura lines the inner side of the thoracic cavity.

(b) The visceral pleura covers the outer surface of each lung.

(c) A small amount of pleural fluid is present between these two membranes, which creates surface tension and causes them to cling together, counteracting the lungs' natural tendency to collapse.

(d) If a hole develops in the thoracic wall or the lung the space may fill with blood or air and the lungs could collapse.

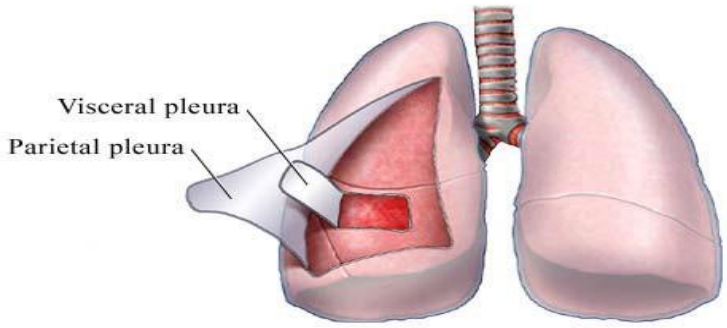


Figure - 2 Pleura

c. **Lungs**:

(1) Occupy the right and left halves of the thoracic cavity.

(a) The right lung is larger than the left lung and is subdivided into three (3) lobes.

(b) The left lung is smaller than the right lung and is subdivided into two (2) lobes.

(2) The air (oxygen) we breathe enters the lungs via the windpipe (trachea), which branches into two main tubes (bronchi) supplying the right and left lung. Oxygen is then exchanged into the blood

stream, supplying the body. Once the body receives its oxygen; oxygen-deficient, carbon dioxide-rich blood returns to the lungs where the carbon dioxide is exhaled and new oxygen begins its process all over.

d. **Mediastinum** - Area in the middle of the thoracic cavity in which all the other organs and structures of the chest cavity lie. The following are located within the mediastinum:

(1) Heart

(2) Great vessels (big arteries and veins)

(3) Trachea (also known as the "windpipe")

(4) Mainstem bronchi (splits into two bronchi- a right and left which supply the left lung and the right lung).

2. SUCKING CHEST WOUND

a. **Definition** - A collection of air or gas in the pleural space causing the lung to collapse most often as a result of penetrating trauma such as a stab or gunshot wound. Many small wounds will seal themselves. These wounds are of particular concern because of their potential to cause a tension pneumothorax. Some large wounds will be completely open, allowing air to enter and escape the pleural cavity. These wounds allow air to enter when the intrathoracic pressure is negative and block the air's release when the intrathoracic pressure is positive; hence the term "sucking chest wound".

b. **Causes** - Most often the result of gunshot wounds, but they can also occur from other penetrating injuries, such as; impaled objects, shrapnel, stab wounds. Motor vehicle accidents, and falls are also known causes of sucking chest wounds.

c. **Signs / Symptoms**:

(1) Chest wall trauma (Bleeding/wound).

(2) Shortness of breath and tachypnea (breathing fast).

(3) Decreased chest wall motion.

(4) May hear a moist sucking or bubbling sounds as air moves in and out of the chest wall defect.

3. **TREATMENT FOR A SUCKING CHEST WOUND**

a. Cover the wound with an occlusive dressing. Tape the dressing on four (4) sides to temporarily seal the wound and prevent the occurrence of a Tension Pneumothorax. (See figure-3)

b. Assess for associated penetrating chest trauma (i.e. exit wounds), and treat as indicated with an occlusive dressing.

c. Monitor for signs and symptoms of Tension Pneumothorax.

d. TACEVAC

Figure – 3 Chest Seal

4. **TENSION PNEUMOTHORAX**

a. **Definition** - A self-sealing type of injury in which air can enter the pleural space but cannot escape via the route of entry. This leads to an increase of pressure in the pleural space and eventual collapse of the lung. Increasing pressure within the pleural space further collapses the lung on the affected side and forces the mediastinum to the opposite side. This can result in two
(2) serious consequences: one (1) breathing becomes increasingly difficult and two (2) the flow of blood into the heart decreases becomes more difficult. (See figure-4).

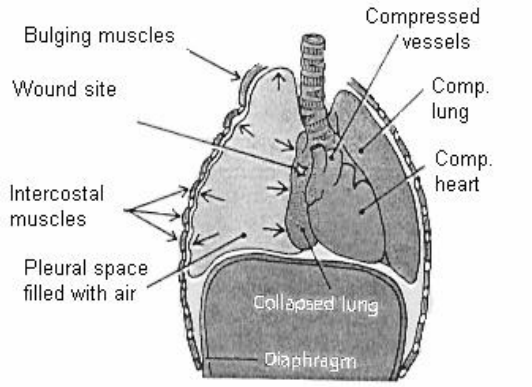


Figure - 4 Tension Pneumothorax

b. **Cause** – Penetrating chest trauma. This is the second leading cause of preventable death on the battlefield.

c. **Signs / Symptoms:**

(1) **Early signs**: unilateral, absent, or diminished breath sounds; continued increased difficulty breathing and increased breathing rate despite treatment.

(2) **Progressive signs**: increasing breathing rate and difficulty breathing, heart rate increases.

(3) **Late signs**: jugular vein distention (JVD), tracheal deviation, and other signs of shock.

Note: A presumptive diagnosis of tension pneumothorax should be made when significant respiratory distress develops with penetrating trauma. A needle thoracentesis should be performed immediately. The additional trauma caused by the needle would not be expected to significantly worsen their condition should he not actually have a Tension Pneumothorax.

5. **TREATMENT FOR A TENSION PNEUMOTHORAX**

a. Treat chest injuries as appropriate (i.e. apply occlusive dressing).

b. Perform needle thoracentesis. This should be performed on all casualties with penetrating chest trauma with an **increase** of respiratory difficulty. Do not wait to see

other signs and symptoms to perform this life saving technique.

6. **Needle Thoracentesis**

a. **Purpose/Definition**

(1) A procedure where a needle and catheter are inserted through the chest wall and into the pleural space. This provides a conduit for the release of accumulated pressure. The procedure reduces pressure on the heart, lungs and major vessels within the chest cavity that has compromised the patient's breathing and circulation.

b. **Landmarks** (See figure-5)

(1) Mid-clavicular line

(2) Jugular notch

(3) Clavicle

(4) Sternum

(5) Third Rib

(6 2n intercostal

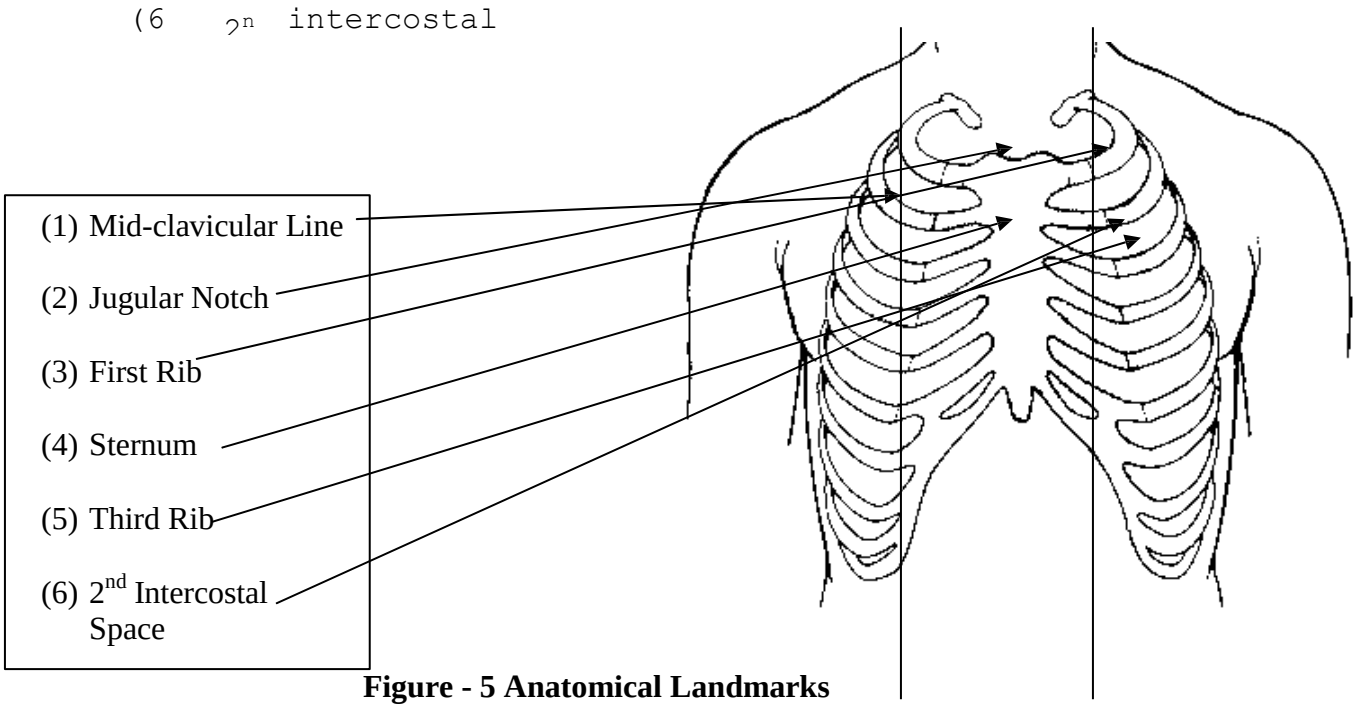


Figure - 5 Anatomical Landmarks

c. **Required Equipment**

(1) Alcohol or betadine swabs.

(2) Decompression needle - 14 gauge and 3.25 inches long is the recommended needle size. (See Figure-6)

Figure – 6 Decompression Needle

d. **Procedural Steps**

(1) Determine the patient's needs for a needle thoracentesis.

(2) Position the patient in the position of comfort.

(3) Assemble required equipment.

(4) Identify the jugular notch and the mid-clavicular line on the affected side of the patient.

(5) Identify the 2nd intercostal space on the affected side. This is approximately three (3) finger widths below the clavicle.

(6) Cleanse the site with alcohol or betadine.

(7) Insert needle at a 90 degree angle into 2nd intercostal space, immediately above the 3rd rib, into the pleural space.

(8) Remove needle, leaving the catheter in place and listen for rush of air.

(9) After pressure is released, remove catheter and rub

puncture site.

(10) Monitor the patient for improvement of breathing status.

(11) Repeat as needed.

(12) TACEVAC ASAP!

e. **Complications**

(1) Hemothorax - Blood within the pleural space. Caused when the needle punctures any of the vessels within the chest wall.

(2) Subcutaneous emphysema - Air becomes trapped within the subcutaneous tissue. Feels like "rice crispies" underneath the skin.

(3) Air embolism - Caused when the needle and air enters a great vessel within the chest wall.

(4) Misdiagnosis - If the diagnosis of a tension pneumothorax is incorrect, the insertion of a thoracentesis needle may actually create a pneumothorax, which may be converted into a tension pneumothorax by positive-pressure ventilation.

REFERENCES:

PHTLS Manual, current edition
MCRP 3-02G

Notes

MANAGE HEMORRHAGIC SHOCK CASUALTIES

1. **LEARNING OBJECTIVES**.

   a. **TERMINAL LEARNING OBJECTIVE**. Without the aid of references, given a description or list, manage hemorrhagic shock casualties, within 80% accuracy, per the stated references. (CLS####)

   b. **ENABLING LEARNING OBJECTIVES**

      (1) Without the aid of references, given a description or list, identify medical terminology associated with the cardiovascular system, within 80% accuracy, per the PHTLS Manual, current edition and MCRP 3-02G. (CLS####)

      (2) Without the aid of references, given a description or list, identify the anatomy of the cardiovascular system, within 80% accuracy, per the PHTLS Manual, current edition and MCRP 3-02G. (CLS####)

      (3) Without the aid of references, given a description or list, identify the signs and symptoms of hemorrhagic shock, within 80% accuracy, per the PHTLS Manual, current edition and MCRP 3-02G. (CLS####)

      (4) Without the aid of references, given a description or list, identify the treatment for hemorrhagic shock, within 80% accuracy, per the PHTLS Manual, current edition and MCRP 3-02G. (CLS####)

OVERVIEW

Shock is an abnormality of the circulatory system that results in an inadequate amount of blood flow and oxygen to organs and tissues. The initial diagnosis of shock is based upon the presence of inadequate organ perfusion and tissue oxygenation. The initial step for managing shock in the injured patient is to recognize its presence.

1. **MEDICAL TERMINOLOGY**

The following terminology is important to understanding the function of the cardiovascular system.

a. Estimated Blood Pressure – blood pressure can be estimated based on the presence of a casualty's heart rate. Below are the parameters for estimating blood pressure:

(1) Radial Pulses = 80/P

(2) Femoral Pulses = 70/P

(3) Carotid Pulses = 60/P

b. Capillary Refill Test - A quick test performed on the nail beds which is an indicator of tissue perfusion (the amount of blood flow to the body's tissues).

(1) Normal Capillary Refill = Capillaries refill in less than three (3) seconds.

2. **ANATOMY OF THE CARDIOVASCULAR SYSTEM**

a. The cardiovascular system consists of a pump (the heart), a container (the vascular system), and circulating fluid (the blood).

b. Pump – four (4) chambered muscle (heart).

c. Container - arteries, veins, and capillaries.

d. Fluid – blood and blood plasma

3. **SHOCK**

Shock is typically classified by its causes. Shock is associated with failure of some component of the cardiovascular system - the volume, container, and/or pump. There are literally hundreds of classifications of shock in medical literature. Because uncontrolled hemorrhage and the shock that ensues is the number one cause of preventable death on the battlefield, we will focus our efforts there.

a. Hemorrhagic Shock

(1) Definition - Loss of blood or blood components. The heart and lungs are functioning normally; however, there is not enough circulating volume within the circulatory system to carry the required amount of oxygen to the body and its vital organs. This is the most common cause of shock on the battlefield.

(2) The average adult blood volume is five (5) to six (6) liters. Normally, a loss of 25% - 40% of the person's total blood volume will create a life-threatening condition. The effects from a traumatic injury can vary from individual to individual.

(3) Massive hemorrhage may be fatal within 60-120 seconds. Treatment should not be delayed and controlling major hemorrhage should be the first priority over securing an airway in a combat environment.

(4) Due to massive blood loss, the body will no longer be able to regulate it’s own core temperature. When the body’s core temperature drops below 95 degrees, ***hypothermia*** can occur. Blood is a source that helps generate the body’s heat.

b. Causes

(1) Loss of Whole Blood - External hemorrhage

(2) Loss of Whole Blood into a Body Cavity: (i.e. thoracic, abdominal, or pelvic region) or into the muscle / tissues (into the quadriceps with a femur fracture) - Internal hemorrhage

(3) Loss of Plasma - Severe burns

c. Signs and Symptoms

(1) Signs and symptoms seen with hemorrhagic shock are usually linked with the amount of blood lost and the casualty's internal reaction to this blood loss.

(2) Heart rate – greater than 100 beats per minute

(3) Respirations – greater than 20 breaths per minute

(4) Capillary refill – greater than 3 seconds

(5) Skin – cool, clammy, pale or cyanotic

(6) Mental status – restless, disoriented, lethargic, or unconscious

d. Treatment

(1) Control LIFE - THREATENING extremity hemorrhage with a tourniquet and non – extremity LIFE – THREATENING hemorrhage with hemostatic agents and pressure dressing. ***This is the most important step in shock prevention and treatment.***

(2) Maintain the patient's airway.

(3) Keep patient warm to prevent hypothermia.

(4) Reassess interventions and monitor vital signs.

(5) TACEVAC.

(6) Prevent hypothermia:

(a) Minimize casualty's exposure to the elements. Keep protective gear on, if feasible.

(b) Replace all wet clothing with dry, if possible.

(c) Wrap casualty in warming layers (ie: blankets, poncho, poncho liner, sleeping system, etc).

(d) Provide heat to the casualty if available.

REFERENCES

PHTLS Manual, current edition
MCRP 3-02G

Notes

MANAGE BURN CASUALTIES

1. **LEARNING OBJECTIVES**.

   a. **TERMINAL LEARNING OBJECTIVE**. Without the aid of references, given a description or list, manage burn casualties, within 80% accuracy, per the stated references. (CLS####)

   b. **ENABLING LEARNING OBJECTIVES**

      (1) Without the aid of references, given a description or list, identify the anatomy of the skin, within 80% accuracy, per the PHTLS Manual, current edition and MCRP 3-02G. (CLS####)

      (2) Without the aid of references, given a description or list, identify the classifications of burns, within 80% accuracy, per the PHTLS Manual, current edition and MCRP 3-02G. (CLS####)

      (3) Without the aid of references, given a description or list, identify the different types of burns, within 80% accuracy, per the PHTLS Manual, current edition and MCRP 3-02G. (CLS####)

      (4) Without the aid of references, given a description or list, treat burns, within 80% accuracy, per the PHTLS Manual, current edition and MCRP 3-02G. (CLS####)

1. **ANATOMY OF THE SKIN**:

a. The most important function is to form a protective barrier against the external environment.

b. The skin also prevents fluid loss, helps regulate body temperature, and allows for sensation.

c. Skin is composed of three layers: the epidermis, dermis, and subcutaneous tissue. (See figure-1)

(1) The epidermis, which is the outermost layer, is made up entirely of skin cells with no blood vessels

(2) Underlying the epidermis is the thicker dermis, made up of a framework of connective tissues containing blood vessels, nerve endings, sebaceous glands, and sweat glands.

(3) The subcutaneous layer is a combination of elastic and fibrous tissue as well as fat deposits.

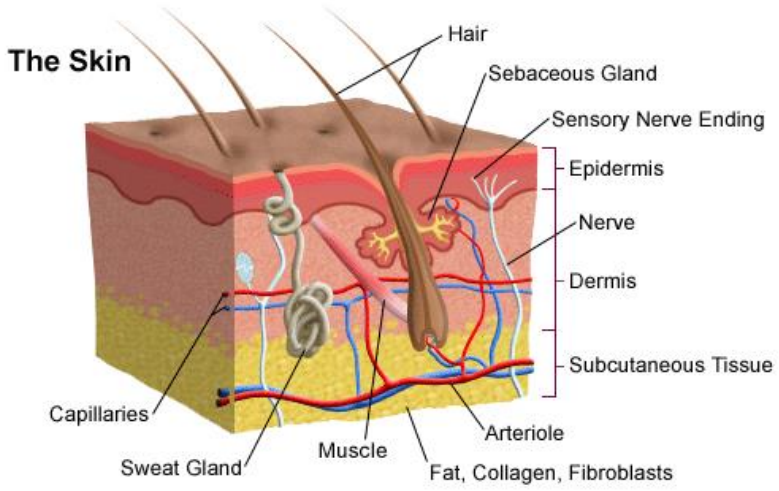


Figure - 1 Anatomy of the Skin

2. **CLASSIFICATIONS OF BURNS**

a. Overview - Burns are classified by the depth of the burn and the extent of the total body surface area (TBSA) of the burn. The severity of all burns will vary depending on the source of the burn, duration of exposure, and location of the burn.

b. The depth of the burn is related to how deep the skin is damaged. Due to the nature of burn injuries, final judgment of burn depth should be withheld for 48 hours after the injury occurs.

c. **First-Degree Burns/Superficial Thickness Burns** – Involves only the epidermis (See Figure-2)

(1) **Signs / Symptoms:**

(a) Dry, red and inflamed skin.

(b) Painful.

(c) The burned area blanches (whites out) under firm pressure.

(d) Typically will heal within (1) one week.

d. **Second-Degree Burns/Partial Thickness Burns** - A burn in which the surface (epidermis) is destroyed and various portions of the dermis are damaged. Second degree burns can be classified as superficial or deep. (See Figure-2)

(1) **Signs / Symptoms:**

(a) Skin will appear glistening or have a wet-appearance.

(b) Blisters or open weeping wounds

(c) Deep, intense pain

(d) Typically will heal in (2-3) two to three weeks.

(e) Fluid loss may be significant depending on the extent of the burn.

e. **Third-Degree Burn/Full Thickness Burn** - A burn in which all (3) three layers of the skin are damaged.

(1) **Signs / Symptoms:**

(a) Skin has a dry, leathery appearance.

(b) The skin can range in color from white, yellow, cherry red, brown, or charred black.

(c) First and second degree burns surround the third degree burn.

(d) Severe pain around periphery of burn, but little to no pain near center of burn.

f. **Fourth-Degree Burns** – A burn that not only encompasses all (3) layers but also includes underlying fat, muscles, bone, or internal organs.

3. **TYPES OF BURNS**

a. Burn injuries have many causes on and off the battlefield. Burns are caused by exposure to extreme heat, a biologic reaction from chemicals, or energy transfer through cells from electrocution or radiation. Many weapons and munitions cause burn injuries. Some, such as incendiary and flame munitions, are designed to cause high heat and burning. Others, such as high explosives, bombs, and mines cause burns secondarily to their primary effect. The four primary causes of burns are **thermal**, **electrical**, **chemical**, and **radiant**.

b. **Thermal Burns**: Thermal burns are the most common type of burn on the modern battlefield. They can result from exposure to flame weapons, incendiary weapons, munitions, IED's or from explosions from fuel sources (gasoline, diesel, and jet fuel). These weapons are designed to burn at very high temperatures and incorporate napalm, thermite, magnesium, and white phosphorous. The primary effect of incendiary and flame munitions against personnel is to cause severe burns. Due to the high burning temperature of these weapons, airway compromise must be considered.

(1) **Napalm** - Burning temperature of 1400-2100 degrees Fahrenheit. Its design and employment against personnel will result in many more burns than other devices.

(2) **Thermite** - Burning temperature of 3600-5400° degrees Fahrenheit, can melt through steel armor.

(3) **Magnesium** - Burning temperature of 5400° Fahrenheit. Hottest burn and can rapidly melt through steel armor.

(4) **White Phosphorous (WP or Willy Pete)** - Burning temperature of 1500° Fahrenheit. This deserves special mention because it combusts with air and continues to burn until the oxygen source is removed. The casualty may be showered with WP fragments from a near-by explosion, which may become embedded in their skin.

c. **Electrical** - Electrical burns may be far more serious than a preliminary examination may indicate. The entrance and exit wounds may be small, but as electricity penetrates the skin, it burns a large area below the surface along the path it travels through the body.
The underlying injuries are not visible to the CLS and could be potential fatal.

d. **Chemical** - Chemical burns occur when the skin comes in contact with various caustic agents. These injuries are not caused by heat but by direct chemical destruction of body tissues.

e. **Radiation** - Burns associated with nuclear blasts and radiation. Skin that is exposed to an explosion is burned by the infrared rays emitted at detonation.

(1) Secondary injuries will include first and second degree burns.

(2) The majority of burns are caused by contact with the secondary sources that ignite such as buildings, vehicles and clothing.

4. **TREATMENT OF BURNS**

a. **Thermal Burns**

(1) FIRST, stop the burning process and don't become a casualty yourself.

(2) Remember your ABCs: for airway burns, find your Corpsman ASAP!

(3) Remove all clothing and jewelry, however do not pull away clothing that is stuck to the burned area.

(4) Wrap the burn loosely with a dry sterile dressing,

covering the burn above and below the affected area.

(a) Water gel may be used to cover the affected area. Then apply a sterile dressing over it.
(See figure-3)

(5) Remember to keep the casualty warm since burned skin is unable to properly maintain body temperature.

(6) Treat all additional injuries (i.e. associated blast injuries, missile or fragment wounds). Keep in mind that skin burns are not immediately fatal and can wait until all other life threats are addressed.

(7) Do not attempt to pop blisters.

(8) Provide pain relief. (e.g. Combat Pill Pack)

(9) TACEVAC!!!

Figure – 3 Water Gel

NOTE: Water Gel - is helpful as it isolates, soothes, and protects the burn from infection. To apply burn gel, simply remove it from the package and apply to affected area, covering the burn gel with a loose dressing for protection (dirt and dust will cling to it if left exposed)

b. **<u>Electrical Burns</u>**

(1) Before touching the victim, stop the source of the current, if possible, turn off the source of the power and deactivate the main circuit

breaker.

(2) Use a nonconductive item, such as a wooden broom handle, rope, dry towel or wooden chair, to disengage the casualty from the current source.

(3) Wrap the burn loosely with a dry sterile dressing, covering the burn above and below the affected area.

(a) Water gel may be used to cover the affected area. Then apply a sterile dressing over it. (See figure-3)

(4) TACEVAC!!!

c. **Chemical Burns**

(1) Immediately flush the affected areas with large quantities of water.

(2) Remove dry chemicals by brushing off loose particles (**DO NOT** use the bare surface of your hand because you could become a chemical burn casualty and brush away from the casualty and you)

(3) For a known acid burn, irrigate the area for at least 15 minutes.

(4) Wrap the burn loosely with a dry sterile dressing, covering the burn above and below the affected area.

(a) Water gel may be used to cover the affected area. Then apply a sterile dressing over it. (See figure-3)

(5) TACEVAC!!!

d. **Radiation Burns**

(1) Treat like a thermal burn

REFERENCES:

PHTLS Manual, current edition
MCRP 3-02G

Notes

PERFORM SPLINTING TECHNIQUES

1. **LEARNING OBJECTIVES**.

   a. **TERMINAL LEARNING OBJECTIVE**. Without the aid of references, given a description or list, perform splinting techniques, within 80% accuracy, per the stated references. (CLS####)

   b. **ENABLING LEARNING OBJECTIVES**.

      (1) Without the aid of references, given a description or list, identify the types of fractures, within 80% accuracy, per the PHTLS Manual, current edition, MCRP 3-02G and NAVEDTRA 14295. (CLS####)

      (2) Without the aid of references, given a description or list, identify the types of splints, within 80% accuracy, per the PHTLS Manual, current edition, MCRP 3-02G and NAVEDTRA 14295. (CLS####)

      (3) Without the aid of references, given a description or list, identify splinting procedures, within 80% accuracy, per the PHTLS Manual, current edition, MCRP 3-02G and NAVEDTRA 14295. (CLS####)

      (4) Without the aid of references, given a casualty, perform splinting techniques, per the PHTLS Manual, current edition, MCRP 3-02G and NAVEDTRA 14295. (CLS####)

OVERVIEW

a. A fracture is any break in the continuity of a bone. Fractures can cause total disability and in some cases death by severing vital organs and/or arteries. Complete recovery depends greatly upon the first aid the casualty receives before being moved.

b. The most common bones in which the CLS will have to deal with are the jaw, clavicle, ribs, pelvis, knee and the bones of the arms and legs (See figure 1).

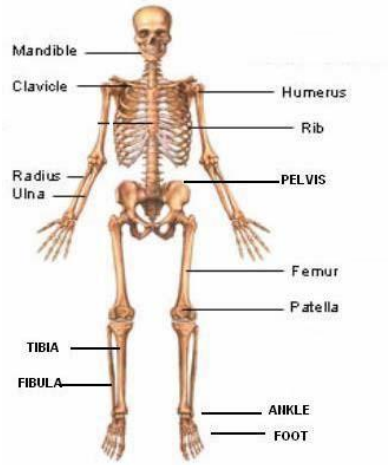


Figure 1. Bones of the body

1. **TYPES OF FRACTURES:**

Fractures will be classified as either open or closed and further classified according to position, number & shape of bone fragments.

a. **Open Fracture** - A broken bone that breaks the overlying skin. The bone may protrude through the skin or a penetrating object such as a bullet or shell fragment may go through the flesh and break the bone. (See figure 2)

b. **Closed Fracture** - A broken bone with no skin penetration. The tissue beneath the skin may be damaged. (See figure 2)

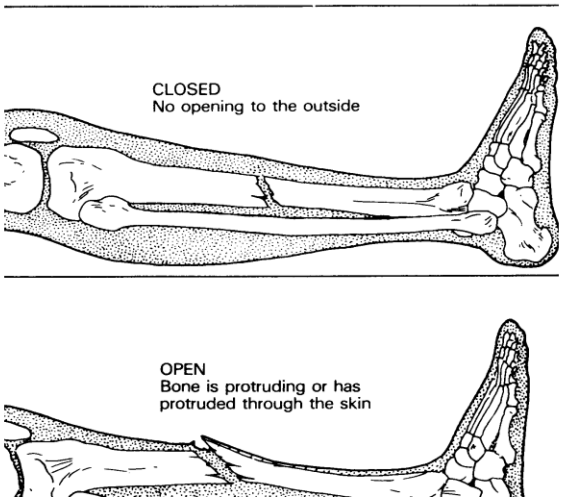


Figure 2. Open/Closed fractures

c. **Signs and Symptoms of Fractures**

(1) Deformity

(2) Swelling

(3) Pain

(4) Inability to move the extremity/sharp pain with movement.

(5) Protruding bone

(6) Crepitus (crunching, grating sound/feeling)

(7) Any injury that may indicate fracture (gun shot wound).

2. **TYPES OF SPLINTS:**

Splints are used to immobilize a portion of the body that is injured, prevent further damage, and to alleviate pain.

a. **Rigid Splints** - Rigid splints cannot be changed in shape. The injured body part must be positioned to fit the splint. Examples include board splints,(wood, plastic, or metal) and inflatable "air splints".

b. **Formable Splints** - Formable splints can be molded into various shapes and combinations to accommodate the shape of the injured extremity. Examples include vacuum splints, pillows, blankets, cardboard splints, SAM splints and wire ladder splints. (See figure 3)

c. **Improvised Splints** - Improvised splints are made from any available material that can be used to stabilize a fracture. Examples include sticks, branches, and tent poles.

d. **Anatomical Splints** - Use of the casualty's body as a splint. Examples include securing the legs together, securing the arm to the body, and taping the fingers together. (See figure 4)

Figure 3. Formable splint

Figure 4. Anatomical splint & bandage

e. **Bandages in splinting** - Bandages can be used to wrap or bind a body part. Bandages hold splints in place, apply additional pressure,& protect the casualty from further harm.

(1) **Sling** - a bandage suspended from the neck to support an upper extremity. When using a sling, position the hand higher then the elbow and never cover the fingers. (See figure 7)

(2) **Swath** - Any band or piece of cloth used to further

immobilize a fracture. (See figure 7)

3. **SPLINTING PROCEDURES:**

Regardless of the type of splint you are using, certain guidelines must be followed.

a. Control hemorrhage and treat for shock.

b. Establish distal pulse prior to splinting.

c. Expose fracture site.

d. If bone is exposed, ensure to cover the ends with sterile dressing prior to splinting.

d. Splint fracture in position found.

e. Attempt to straighten a deformed limb only if it is a closed injury with no distal pulses.

f. Do not try to reposition or put back an exposed bone.

g. Move the fractured part as little as possible while applying the splint.

h. Pad the splint at any bony prominence points (i.e. elbow, wrist or ankle).

i. Immobilize the splint above and below the fracture.

j. Reassess distal pulses after splint is secured.

k. When in doubt, treat all injuries as a possible fracture.

l. TACEVAC if needed after consulting with the Corpsman.

4. **TECHNIQUES FOR SPLINTING FRACTURES:**

The CLS may be required to immobilize and/or splint a variety of fractures. The most common fractures encountered are:

a. **Fractured Jaw**

(1) Apply a bandage to immobilize jaw (Modified Barton). (See figure 5).

(2) The bandage should pull the lower jaw forward

(3) Support should be on the head, not behind neck.

(4) Do not lay casualties with lower jaw fractures on their back. Doing so may cause airway obstruction.

Figure 5. Immobilized Jaw

b. **Fractured Clavicle**

(1) Immobilize using figure eight bandage. (See figure 6)

(2) Bend casualty's arm on injured side, forearm across chest.

(3) Palm should be turned in, thumb pointed up.

(4) Hand should be raised 4 inches above elbow.

(5) Support using a cravat to cradle the arm & tie around the body for immobilization (Sling and Swath). (See figure 7)

Figure 6. Immobilized Clavicle

Figure 7. Sling & Swath

c. **Fractured Humerus**

(1) Check for distal pulse

(2) If fracture is located on the upper arm near shoulder, place padding in the armpit, bandage arm securely to body (See figure 8).

(3) If fracture is located in the middle of upper arm, use splint on outside of arm.

(4) Splint the injury to the body using a full arm wrap (Kerlex or cravat wrap). Support with sling (See figure 9).

(5) If fracture is near elbow, splint in position found. Support with sling.

(6) Re-check distal pulse.

Figure 8. Upper arm splint 1

Figure 9. Upper arm splint 2

d. **Fractured Forearm**

(1) Check for distal pulse

(2) If only one bone in the forearm is broken, the other may be used as a splint.

(3) Apply two splints (rigid or formable), one on top and one on the bottom.

(4) Ensure that the splints cover from wrist to elbow (rigid or formable splint). (See figure 10)

(5) Use bandages to hold splints in place.

(6) Re-check distal pulse

(7) Place casualty's forearm across the chest, palm turned in and thumb pointing up.

(8) Support with sling & swath.

Figure 10. Forearm Splint

e. **<u>Fracture Wrist/Hand</u>**

(1) Check radial pulse

(2) Splint in position of function leaving fingers exposed (formable splint). (See figure 11)

(3) Re-check radial pulse

(4) Support with sling.

Figure 11. Wrist/Hand Splint

f. **<u>Fractured Ribs</u>**

(1) Assess ABC's for possible complications

(2) Ordinarily, rib fractures are NOT bound, strapped or taped if the victim is reasonably uncomfortable.

(3) Immobilize by strapping the arm from the injured side to the chest to limit motion.

(4) Arm should be against the chest, palm flat, thumb up and forearm raised to a 45 degree angle. (See figure 12)

(5) Secure arm to chest using swath bandage. (See figure 12)

(6) NEVER encircle the chest with any type of constricting bandage. This will only make breathing more difficult!

Figure 12. Rib Splint

g. **Fractured Pelvis**

(1) Check distal pulse

(2) Place patient in position of comfort (legs straight or knees bent).

(3) Place pillow or padding between the legs to immobilize hip.

(4) Wrap sheet (or poncho) snuggly around pelvis for support

(5) Tie knees and ankles together for greater stability. (See figure 13)

(6) Re-check distal pulse

Figure 13. Pelvis Splint

h. **Fractured Femur**

(1) Check distal pulse

(2) Using four (4) cravats to secure injured leg to the uninjured leg (anatomical splint). (See figure 14)

(a) Secure thighs together

(b) Secure another cravat directly above and below the knees

(c) Using a figure 8 wrap, secure ankles & feet together

(3) Re-check distal pulse

(4) **NOTE: Consider traction splinting for midshaft fractures.

Figure 14. Femur Splint

i. **Fractured Patella**

(1) Check distal pulse

(2) Splint in position of comfort

(3) Place splint underneath the entire leg. Ensure you have padding at least under the knee and ankle.

(4) Secure splint in four places (See figure 15):

(a) Just below knee
(b) Just above knee
(c) Around the ankle
(d) Around the thigh

(5) Re-check distal pulse

Figure 15. Patellar Splint

j. **Fractured Tibia/Fibula**

(1) Check distal pulses

(2) If only one bone is broken, the other can act as a splint.

(3) Utilize the stirrup method with the SAMS splint. (See figure 16)

(4) Apply splint on both sides of tibia and fibula

(5) Use kerlex bandage to secure splint.

(6) Immobilize from knee to ankle.

(7) Re-check distal pulse

Figure 16. Stirrup Splint

k. **Fractured Ankle/Foot**

(1) Check pedal pulse

(2) Splint injury (See figure 17)

(a) Wearing boots: use figure 8 with a cravat to secure ankles together.

(b) Without boots: Wrap ankle with a bandage (kerlex), then use a figure 8 wrap with a cravat to secure ankles and feet together.

(3) Re-check pedal pulse

Figure 17. Ankle/Foot Splint

1. **Spinal Injury** - The first priority is to ensure the casualty is in a safe location. Next the CLS may begin spinal immobilization procedures.

   (1) **Indications for spinal immobilization**:

      (a) High speed vehicle crash (>30mph)

      (b) Falls from great heights (2-3x body height)

      (c) Direct, blunt neck trauma

      (d) Blast injury

   (2) To be effective, the casualty must be immobilized from the head to the pelvis.

   (3) Do not block the casualties airway

   (4) Use a C-Collar to immobilize the neck

   (5) If available secure casualty to a long spine board

   (6) If full immobilization is not possible, prevent excessive, unnecessary movement of the casualty.

NOTE*:* Remember to treat all life-threatening injuries first prior to treating fractures. Not all casualties will require evacuation. The CLS should consult with the Corpsman before evacuating casualties.

REFERENCES

PHTLS Manual, current edition
MCRP 3-02G
NAVEDTRA 14295

Notes

ADMINISTER BATTLEFIELD MEDICATIONS

1. **LEARNING OBJECTIVES**.

   a. **TERMINAL LEARNING OBJECTIVE**. Without the aid of references, given a casualty, administer battlefield medications, within 80% accuracy, per the stated references. (CLS####)

   b. **ENABLING LEARNING OBJECTIVES**

      (1) Without the aid of references, given a description or list, identify battlefield antibiotics, within 80% accuracy, per the PHTLS Manual, current edition. (CLS####)

      (2) Without the aid of references, given a description or list, identify oral pain medications, within 80% accuracy, per the PHTLS Manual, current edition. (CLS####)

      (3) Without the aid of references, given a description or list, identify the usage of morphine, within 80% accuracy, per the PHTLS Manual, current edition. (CLS####)

      (4) Without the aid of references, given a description or list, identify the proper treatment of drug allergies, within 80% accuracy, per the PHTLS Manual, current edition. (CLS####)

2. **BATTLEFIELD ANTIBIOTICS**

   a. Overview - The use of antibiotics on the battlefield has shown to be a huge improvement to the quality of care of our casualties. In Mogadishu in 1993, there were 58 casualties; 16 in which developed wound infections. The infection rate was at 28%. Another study showed that 32 casualties sustained open wounds. ALL of the casualties received battlefield antibiotics. The outcome resulted in NONE developing infection.

b. Antibiotics

(1) Recommended for all open wounds sustained on the battlefield.

(2) Antibiotics must be given early to prevent wound infections.

(3) Wound infections can kill the casualty or delay their recovery.

c. Moxifloxacin

(1) Antibiotic that kills most bacteria.

(2) Dosage: One 400mg tablet daily.

(3) If casualty is unconscious, seek medical assistance! The corpsman can provide antibiotics through the intravenously (IV) and intramuscular (IM) routes.

2. **PAIN MEDICATIONS**

a. Mobic and Tylenol

(1) The medications of choice for oral administration.

(2) They DO NOT:
- interfere with blood clotting.
- alter mental status.

(3) The combination of Mobic and Tylenol can provide significant pain relief to casualties who are able to continue as combatants. However, if a casualty's wounds are not significantly painful, NO medication is needed.

b. Combat Pill Pack (See figure 1)

(1) Pre-packaged pain medications and antibiotics in a foil pouch or plastic bag that is prepared by the Battalion Aid Station.

(2) These medications should be carried by everyone in the unit and be self-administered as soon as possible after sustaining an open wound.

(3) Contents:
- Mobic – one tablet of 15mg
- Tylenol – two tablets of 650mg each
- Moxifloxacin – one tablet of 400mg

Figure 1.

c. Drug Allergies

(1) Patients with allergies to aspirin or other non-steroidal anti-inflammatory drugs (NSAIDS) should NOT use Mobic. Severe reactions have been reported in these patients.

(2) Allergic reactions to Tylenol are uncommon.

(3) Monitor the casualty for any signs of throat swelling and airway compromise. Maintain ABC's and find your Corpsman.

(4) TACEVAC!

3. **MORPHINE**

a. Morphine (See figure 2)

(1) A naturally occurring central nervous system depressant that is derived from opium. Morphine auto-injectors are issued to be able to relieve **severe pain** in the wounded.

Figure 2.

(2) Indications:
- Severe pain

(3) Contraindications:
- Serious head injury
- Altered mental status
- Unconsciousness
- Low blood pressure
- Shock
- Difficulty breathing
- Scorpion stings

(4) Administration and Dosage:

(a) 10mg auto-injector given intramuscularly every four (4) hours as needed for pain. (See figure 2)

(b) Remove the red safety cap from the morphine injector.

(c) Within the injector is a needle. Place the purple end on the thickest part of thigh or buttocks until injector functions.

(d) Hold firmly in place for ten (10) seconds, and then remove. (See figure 3)

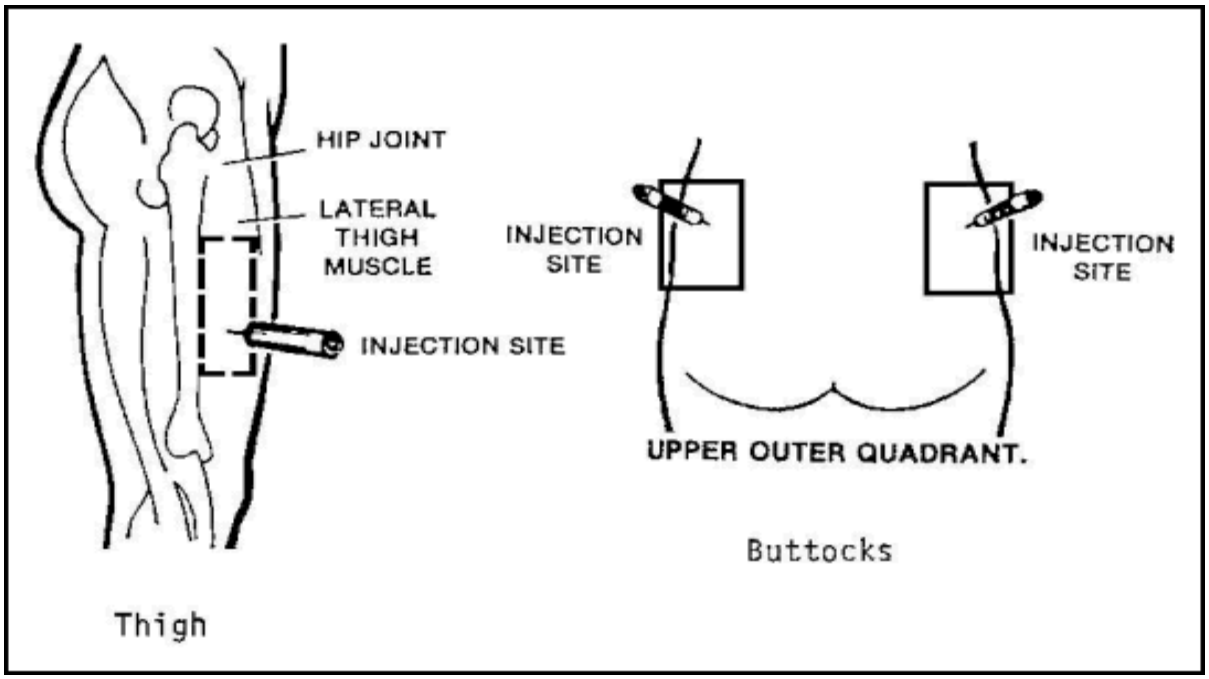


Figure 3.

(e) The area in which the morphine was administered may be massaged to increase absorption into the circulatory system.

(f) After the morphine has been administered, it is important to attach the spent injector to the pocket flap of the cammie blouse. This is done to show that morphine has been given to the casualty.

(g) The letter "M" and the time that the morphine was administered must also be written on the casualty's forehead in indelible ink.

b. <u>Morphine Overdose</u>

(1) Morphine overdose is caused by too much morphine in the body.

(2) Signs and symptoms:
- Pinpoint pupils
- Decreased respirations
- Progressive fall in blood pressure
- Cyanosis
- Stupor or coma
- Skeletal muscle flaccidity

- Cold, clammy skin
- Decreased heart rate

(3) Treatment:
- Maintain airway
- Find the Corpsman!

REFERENCES

PHTLS Manual, current edition

Notes

PERFORM CASUALTY MOVEMENT

1. **LEARNING OBJECTIVES**.

a. **TERMINAL LEARNING OBJECTIVE**. Without the aid of references, given a casualty, perform tactical evacuation, per the stated references. (CLS####)

b. **ENABLING LEARNING OBJECTIVES**.

(1) Without the aid of references, given a casualty, identify the types of manual carries, within 80% accuracy, per the PHTLS Manual, current edition and MCRP 3-02G. (CLS####)

(2) Without the aid of references, given a casualty, identify the types of litter transportation, within 80% accuracy, per the PHTLS Manual, current edition, MCRP
3-02G. and MCRP 3-02G. (CLS####)

(3) Without the aid of references, given a casualty, perform manual carries, per the PHTLS Manual, current edition and MCRP 3-02G. (CLS####)

(4) Without the aid of references, given a casualty, perform litter carries, per the PHTLS Manual, current edition and MCRP 3-02G. (CLS####)

1. **MANUAL CARRIES**

(a) **Fireman's Carry**. (See figure 1) - Most commonly used in a hostile environment. Used for unconscious and conscious casualties.

(1) Lift casualty's legs at the knees. (See figure 1A)

(2) Step on the casualty's feet, while grabbing and pulling one arm of the casualty. Pull casualty's arm while lifting him/ her into the standing position. (See figure 1B)

(3) Bend at the knees pulling the casualty's arm over your head. Pass your other arm in between the casualty's legs, lifting the casualty onto the back of your shoulders. (See figure 1C)

(4) With the casualty high on your back, wrap your arm around the casualty's leg, grabbing his/ her other arm with the same hand. This will free one of your hands in order to maintain control and operate your weapon. (See figure 1D)

figure 1A

figure 1B

Figure 1C

figure 1D – Fireman's Carry

(b) **<u>One-Man Support Carry</u>**. (See figure 2) - Used for conscious patient with minimal injury that will allow him to assist in carry.

(1) Raise the patient from the ground as in the fireman's carry.

(2) With your left or right hand grasp the casualty's wrist and draw it around your neck. Place your left or right arm around their waist.

(3) The patient will be able to walk by using the the CLS as a crutch.

Figure 2 – One-Man Support Carry

(c) **Saddleback Carry**. (See figure 3) - Used for a conscious casualty that is able to hold on to the CLS.

(1) Raise the casualty to upright position.

(2) Support the casualty by the waist and move to the front of the casualty.

(3) Have casualty wrap his/ her arms around your neck.

(4) Stoop, raise the casualty to your back and clasp hands beneath the casualty's thighs.

Figure 3 – Saddleback Carry

(d) **Pack-Strap Carry**. (See figure 4); (aka: Hawe's carry)- This carry accommodates an unconscious casualty and keeps his or her weight slightly lower than the saddle back carry. It employs good mechanical advantage to lift the casualty but can move the casualty only for moderate distance.

(1) Raise the casualty from the ground as in the fireman's carry.

(2) Support by waist and move to front of casualty.

(3) Grasp the casualty's wrists and hoist onto your back until their armpits are over your shoulders.

(4) Lean forward, lifting the casualty with your shoulders and legs.

Figure 4 – Pack-Strap Carry

(e) **Two-Man Support Carry**. (See figure 5); (aka: SEAL Team 3 carry) - This carry supports the casualty without carrying the casualty's full weight.

(1) Bring the casualty to the standing position.

(2) Both CLS's will place casualties arms over their shoulders, then both CLS's will grab the casualty's wrist tightly and pull down.

(3) Both CLS's will wrap their free hand around the casualties back.

Figure 5 – Two-Man Support Carry

(f) **Two-Man Carry**. (See figure 6) - Used for placing patient on a litter or moving short distances.

(1) Both CLS's kneel at one side of patient.

(2) One CLS places an arm beneath the hips and the other arm beneath the knees.

(3) The second CLS places an arm beneath the shoulder and one beneath the back.

(4) Lift patient to knees, then stand up and carry at chest level to lessen fatigue.

Figure 6 – Two-Man Carry

(g) **Two-Hand Seat Carry**. (See figure 7) - An efficient carry when you have access to both sides of the casualty and your evacuation route is relatively wide. The carry becomes difficult for long distances. This carry is for the conscious casualty. This carry is best used for transporting casualties with a head or foot injury for a moderate distance. This carry is also useful for placing casualties on a litter.

(1) Each CLS grasps the other's wrist/ forearm.

(2) The two CLS's lower themselves sufficiently for the casualty to sit in between their arms then, they have the casualty place their arms around their shoulders for support. The CLS's will then rise to an upright position.

Figure 7 – Two-Hand Seat Carry

(h) **Four-Hand Seat Carry**. (See figure 8) - Only a conscious casualty can be transported by this carry because they must help support themselves by placing their arms around the CLS's shoulders. This carry is best used for transporting casualties with a head or foot injury for a moderate distance. This carry is also useful for placing casualties on a litter.

(1) Each CLS grasps one of his/ her wrists and one of

the other CLS's wrist, thus forming a packsaddle.

(2) The two CLS's lower themselves sufficiently for the casualty to sit on the packsaddle: then, they have the casualty place their arms around their shoulders for support. The CLS's will then rise to an upright position.

Figure 8 – Four-Hand Seat Carry

(i) **Fore and Aft carry**. (See figure 9) - Is a simple and effective way to move a casualty over smooth to moderately rough terrain. It does not provide spinal support or accommodate casualty injuries very well.

(1) Position the casualty in a supine position, then have CLS approach from the head. Squat and move the casualty to a semi-seated position. The CLS will place their hands under the casualty's arms and lock them across the chest.

(2) The second CLS will stand between the casualty's feet, facing away from the casualty. Squat down and grasp the casualty's legs from the outside and just above the knees.

(3) On the first CLS's count, the CLS's will lift the casualty simultaneously and proceed to transport the casualty.

Figure 9 – Fore and Aft Carry

(j) **Clothes Drag**. (See figure 10) - Used when in a hostile environment and "under fire" and is necessary to get casualty out of fire or danger by maintaining a low profile until a lift can be used.

(1) Grasp the casualty by their gear or clothes and pull them to safety.

(2) An optional drag line may be attached from the casualty to yourself in order to provide the CLS the opportunity to continue using his/ her weapon.

Figure 10 – Clothes Drag

2. **LITTER TRANSPORTATION**

(a) **Army Litter**. (See figure 11) - The standard collapsible litter is most widely used. It folds along the long axis.

Figure 11 – Army Litter

(b) **Poleless Non-rigid Litter**. (See figure 12) - This litter can be folded and carried by individuals very easily and takes little space. It does NOT provide stability for the spine.

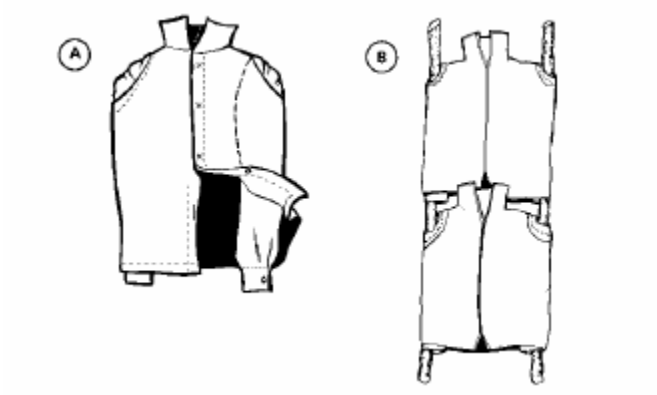
Figure 12 – Poleless Non-Rigid Litter

(c) **Talon Collapsible Litters**. (See figure 13) – This litter is compact and versatile. This litter can provide casualty transport in restricted compartments, and comes with collapsible handles.

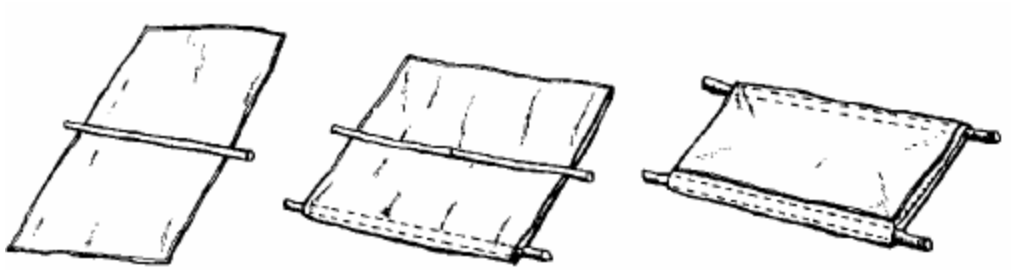
Figure 13 – Talon Collapsible Litter

(d) **Improvised Litters**. (See figure 14) - An improvised litter is anything that you can use to transport, drag, or carry a casualty to safety. It will be used when a standard litter is not available and manual carries are not feasible due to the distance of travel.

BLOUSE/FLAK LITTER



BLANKET/PONCHO LITTER



ROLLED BLANKET LITTER

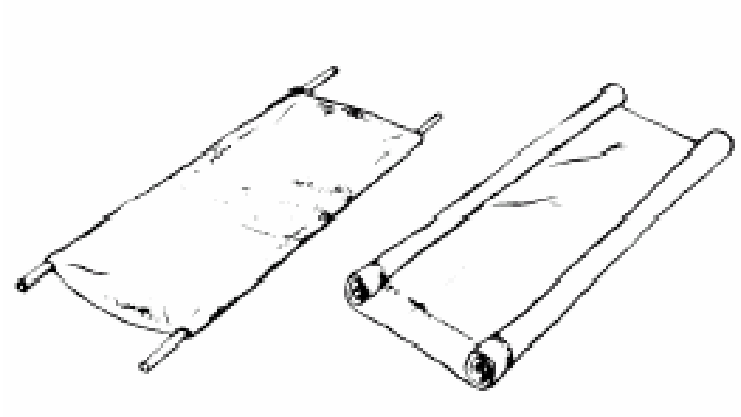


Figure 14 – Improvised Litters

(e) **Procedures for Carrying Litters**:

(1) In moving a casualty the bearers must take every movement deliberately and as gently as possible.

(2) The rear bearers should watch the movements of the front bearers and time their movement accordingly to ensure a smooth and steady action.

(3) The litter must be kept as level as possible at all times, especially when crossing obstacles.

(4) The casualty should be carried on the litter feet first, except when going uphill or up stairs; the head should then be forward. If the casualty has a fracture of a lower extremity, he should be carried uphill or upstairs feet first and down hill or down stairs head first to prevent the weight of the body from pressing on the injured part.

REFERENCES:

PHTLS Manual, current edition
MCRP 3-02G

Notes

PERFORM COMBAT LIFESAVER TRIAGE

1. **LEARNING OBJECTIVES**.

a. **TERMINAL LEARNING OBJECTIVE**. Without the aid of references, given a casualty, perform Combat Lifesaver triage, per the stated references. (CLS####)

b. **ENABLING LEARNING OBJECTIVES**.

(1) Without the aid of references, given a casualty, identify the triage categories, within 80% accuracy, per the PHTLS Manual, current edition and MCRP 3-02G. (CLS####)

(2) Without the aid of references, given a casualty, identify the tactical evacuation priorities, within 80% accuracy, per the PHTLS Manual, current edition and MCRP 3-02G. (CLS####)

(3) Without the aid of references, given a casualty, perform a 9-line tactical evacuation request, per the PHTLS Manual, current edition and MCRP 3-02G. (CLS####)

OVERVIEW

Triage is the French word meaning "to sort". Triage is based on a casualty's need for immediate medical treatment and establishes the order for treatment and movement. It is a continuous, on-going process and does not stop after your initial assessment. Triage will ensure the greatest care for the greatest number of casualties and will also maximize personnel and resources.

1. **TRIAGE CATEGORIES**

a. Category I - MINIMAL (GREEN TAG)

(1) Also called the "walking wounded." These individuals have injuries that will still need treatment, however, are unlikely to deteriorate over the next few days. This category includes those with relatively minor injuries who can effectively care for themselves or can be helped by non-medical personnel. Examples include:

(a) Minor lacerations

(b) Abrasions

(c) Fractures of small bones

(d) Minor burns

(e) Sprains, strains and uncomplicated dislocations

(f) Dental pain

(g) Frostbite

(h) Penetrating injuries to extremities where

hemorrhage is controlled

b. Category II - DELAYED (YELLOW TAG)

(1) Includes injuries that are potentially life threatening. That may require extensive and intensive treatment; however, they are not expected to significantly deteriorate over several hours. Examples include:

(a) Large soft tissue wounds

(b) Fractures, dislocations, or injuries causing circulatory compromise

(c) Severe bleeding controlled with a tourniquet or other means.

(d) Open fractures and dislocations

(e) Penetrating, abdominal, thoracic, spinal, or head injuries not involved with the airway

(f) Uncomplicated major burns that are less than 20% TBSA

(g) Severe combat stress or psychosis (loss of contact with reality; patients may experience hallucinations and delusional beliefs).

c. Category III - IMMEDIATE (RED TAG)

(1) Includes all compromises to a casualty's ABCs. If immediate medical attention is not provided, the patient will die. These injuries include:

(a) Airway compromise:

1) Upper airway obstruction

2) Extreme 2nd or 3rd degree facial burns

(b) Breathing compromise:

1) Tension pneumothorax

2) Needle thoracentesis

3) Severe respiratory distress

(c) Circulation compromise:

1) Life threatening hemorrhage

(d) Other:

1) Heatstroke

2) Shock

3) Rapidly deteriorating responsiveness

4) Abdominal injuries

d. Category IV - EXPECTANT (BLACK TAG)

(1) This category is comprised of patients whose treatment would be time consuming and extremely complicated coupled with a low chance of survival. The extent of their treatment depends on available supplies and manpower. These patients should not be abandoned and every effort should be devoted to their comfort. Once all immediate and delayed patients are treated, expectant patients will be re- triaged and treated based on remaining medical supplies and personnel. Examples include:

(a) Cardiac arrest (no breathing, no pulse)

(b) Massive brain / head trauma

(c) Second or third degree burns over 70% body surface area (BSA)

2. **TACEVAC PRIORITIES**

a. If the casualty requires further medical treatment after being re-triaged and stabilized at the BAS, he/ she will need to be evacuated to a higher echelon of care. During this evacuation, the casualty must be prioritized based
on his/ her injuries.

b. TACEVAC priorities are different than the first and formal triage categories.

c. The priorities are as follows:

(1) Urgent Evacuation:

(a) Evacuation to next higher echelon of medical care is needed to save life or limb. NOTE: Patients who need surgery are classified as "Urgent Surgical".

(b) Evacuation must occur within 2 hours.

(2) Priority Evacuation:

(a) Evacuation to next higher echelon of medical care is needed or the patient will deteriorate into the URGENT category.

(b) Evacuation must occur within 4 hours.

(3) Routine Evacuation:

(a) Evacuation to the next higher echelon of medical care is needed to complete full treatment.

(b) Evacuation may occur within 24 hours.

NOTE: The tactical situation and availability of TACEVAC transport vehicles will dictate who will be evacuated out of the area first.

3. **9-LINE TACEVAC REQUEST**

a. **Line 1: Location** - This is the location of the LZ where the casualties are to be picked up.

b. **Line 2: Radio Frequency, Call Sign** - This is the radio frequency and call sign that will be used by the ground unit at the LZ.

c. **Line 3: Precedence (Urgent, Priority, Routine)** - This is the number of casualties by precedence.

(1) Urgent/Urgent Surgical - The casualty must be moved immediately to save life of limb, or to prevent complications of a serious illness. He must be picked up within 2 hours.

(2) Priority - The casualty requires prompt medical care. He must be picked up within 4 hours.

(3) Routine - The casualty has minor injuries or is a KIA. He must be picked up within 24 hours.

d. **Line 4: Special Equipment** - This line identifies any special equipment that will be needed, such as a hoist in the case where a helo cannot land.

e. **Line 5: Number of Patients by Type** - This is the number of patients who can walk and the number who will be on litters. This determines whether or not the helo should be configured to carry litters.

f. **Line 6: Security of Pickup Site** - This is whether of not the enemy is near the LZ. If all of your casualties are routine and the LZ is not secured, then you may not get your requested TACEVAC approved.

g. **Line 7: Method of Marking Pickup Site** - This is the method that you will use to display your mark and then ask the pilot to identify.

h. **Line 8: Patient's Nationality and Status** - This is the patients' nationality (US Marine, Corpsman, EPW, etc.) and status (Citizen, non-citizen or holding a visa).

i. **Line 9: NBC Contamination** - This is whether the LZ has been contaminated with NBC agents.

REFERENCES:

PHTLS Manual, current edition
MCRP 3-02G

Notes

PERFORM COMBAT LIFESAVER CARE

1. **LEARNING OBJECTIVES**.

a. **TERMINAL LEARNING OBJECTIVE**. Without the aid of references, given a description or list, perform combat lifesaver care, within 80% accuracy, per the stated references. (CLS####)

b. **ENABLING LEARNING OBJECTIVES**.

(1) Without the aid of references, given a description or list, identify the fundamentals of Tactical Combat Casualty Care, within 80% accuracy, per the PHTLS Manual, current edition. (CLS####)

(2) Without the aid of references, given a description or list, identify the sequence steps in performing Care Under Fire to prevent further injury or death, per the PHTLS Manual, current edition. (CLS####)

(3) Without the aid of references, given a description or list, identify the sequence steps in performing Tactical Field Care to prevent further injury or death, per the PHTLS Manual, current edition. (CLS####)

1. **FUNDAMENTALS OF TACTICAL COMBAT CASUALTY CARE (TCCC)**

a. **Objectives for TCCC**.

(1) Treat the casualty

(2) Prevent additional casualties

(3) Complete the mission

b. Remember that good medicine can sometimes be bad tactics. Bad tactics can get people killed and cause the mission to fail. What's best for the casualty and what's best for the mission may be different.

c. TCCC guidelines divide the pre-hospital care of combat casualties into three phases:

(1) Care under fire

(2) Tactical field care

(3) Tactical Evacuation (TACEVAC) Care

d. This chapter will focus on the assessment of the trauma casualty within the first two phases of the Tactical Combat Casualty Care management plan.

2. **PHASE 1: CARE UNDER FIRE**.

a. **Definition** – The CLS and casualty are still under hostile fire. Enemy fire is within range and deadly.

b. **Goals**

(1) Maintain fire superiority. Fire supremacy is key to preventing combat trauma.

(2) If able, casualty stays engaged as a combatant. Return fire as directed or required.

(3) Instruct casualty to move to cover and apply self- aid if possible.

(4) Keep casualty from sustaining additional wounds.

c. **Process**

(1) **Scene Size-Up** - Begins as you enter the fire zone. The CLS needs to begin assessing the scene, consider body substance isolation and ask the following questions:

(a) "IS THE SCENE SAFE"? Scene safety is the primary concern. Any condition (environmental or tactical) that can be considered harmful to either the casualty or the CLS must be addressed and corrected to produce the safest scene possible

(b) "WHAT IS THE MECHANISM OF INJURIES (MOI)"?

1) What caused the injuries?

2) How bad are the injuries? A quick blood scan around the patient can be accomplished as the CLS approaches the casualty.

(c) "HOW MANY CASUALTIES DO I HAVE"? Triage will be based upon the number of casualties, the access to those casualties and medical gear available.

(d) "DO I HAVE ANY HELP"? The situation may leave the CLS to work alone.

(e) "DOES THE PATIENT HAVE A C-SPINE INJURY"? The CLS will consider C-spine precautions even if the situation does not allow for proper treatment of a spinal injury.

(2) **Casualty Treatment in Care Under Fire(CUF)**:

(a) Stop any life-threatening external Hemorrhage from extremities with a tourniquet (if tactically feasible).

(b) If not tactically feasible (e.g. fire superiority has not been obtained), do not try to treat the casualty in the kill zone. Application of a tourniquet may be deferred until patient has been moved to safety.

(c) Move casualty to cover as quickly as possible utilizing an evacuation plan and recommended carries.

(3) **Patient Movement Plan in Care Under Fire**:

(a) Considerations

1) Conscious vs. Unconscious

2) Location of nearest cover

3) Best way to move patient to cover

4) Risk to rescuer

5) Weight differences

6) Distance covered

(b) Recommended carries for CUF

1) One person drag with/without line

2) Two person drag with/without line

3) Two man support carry (aka Seal Team 3 carry)

4) Pack strap carry (aka Hawes carry)

3. **PHASE 2: TACTICAL FIELD CARE**:

a. **Definition** - The CLS and casualty are no longer under effective hostile fire. Medical equipment is limited.

b. **Goal** - This phase is designed to help the CLS systematically locate, identify and treat all life threatening and non-life threatening injuries.

c. **Process**: This assessment should be completed as quickly as possible.

(1) If life-threatening hemorrhage was not identified and/or controlled in CUF, it should be addressed at this point. May utilize hemostatic agents, direct pressure, dressings and/or bandages here and beyond.

(2) Casualty's Mental Status.

(a) Determine the casualty's responsiveness using the AVPU acronym.

(b) If the patient is conscious the CLS will obtain the chief complaint.

(c) Casualties with an altered mental status should be disarmed immediately.

(d) If the CLS does not receive a response, assessment and treatments will continue according to the casualty's injuries.

(3) Airway Management.

(a) Open airway using modified jaw thrust or the trauma chin lift.

(b) Look in the mouth for foreign objects, broken teeth, bleeding into the airway, vomit, burns, and edema.

(c) Clear any potential obstructions.

(d) Assess the airway for 5 to 10 seconds, LOOK, LISTEN and FEEL.

(e) Insert a nasopharyngeal airway (NPA). (See figure 1)

(f) If the patient is conscious the CLS should continually talk to the patient to ensure that the patient has an open airway, this also serves to calm the patient.

Figure 1. NPA INSERTION

(g) Reassess the casualty's airway after intervention (look, listen, feel) and obtain an approximate:

1) Rate (# of respirations in the # of seconds).

2) Rhythm (rapid, slow).

3) Depth (deep, shallow, labored).

NOTE
A system of reassessing any intervention (airway, TQ, and pressure dressing) after placement should become standard procedure for all CLS. ANY movement may cause changes to your interventions and MUST BE REASSESSED!!! If you do something for your casualty, make sure it works!

(4) Breathing Assessment

(a) Inspect, Auscaltate, Palpate

Inspect the anterior chest for bilateral rise and fall during respirations and any penetrating trauma.

Auscaltate the chest, bad side then good side, listen and note lung sounds.

Palpate, feeling for any abnormalities.

(b) Treat all life-threatening penetrating injuries (e.g. sucking chest wound) from the naval to the chin with an occlusive dressing

(c) Perform a needle thoracentesis, when indicated, to treat for a tension Pneumothorax.

(5) Palpate the Posterior Thorax

(a) Feel for any penetrating trauma, blood or any other sign of injury.

(b) The patient needs to be log-rolled with as little spinal manipulation as possible.

(c) Treat posterior open “sucking” chest wounds with an occlusive dressing.

(6) Circulatory Assessment

(a) Check for a Carotid Pulse

(b) Perform a Blood Sweep

1) Breaking the extremities into two (2) sections the CLS sweeps the downside of each limb, feeling for blood and wounds.

2) If blood is found, identify exactly where the bleeding is coming from. Gain control on any life-threatening hemorrhage.

(c) Assess for Radial Pulses.

1) Rate (Beats Per Minute).

2) Quality (strong, weak, thready).

3) Estimated Blood Pressure (BP).

(d) Assess Peripheral Perfusion.

1) Skin Color (pale/flushed/normal).

2) Skin Temp (cold/cool/warm/hot).

3) Skin Condition (dry/moist).

4) Capillary Refill less than three (3) seconds.

**NOTE: Unless contraindicated, at this point, consider placing the casualty in the recovery position or the sit up/lean forward airway position.

(7) Assess for Shock

(a) Identify any signs or symptoms associated with shock.

(b) Take preventative measures.

(8) Prevent Hypothermia

(a) Ensure that all hemorrhage is controlled.

(b) Keep patient warm.

(9) Administer Medications

(a) Utilize the Combat Pill Pack for treatment of all open wounds.

(b) Use Morphine for severe pain. (Administered only by medical personnel)

(c) Take caution and be aware of all contraindications for administering medications.

(10) Manage Fractures

(a) Identify all fractures from head to toe.

(b) Splint appropriately.

(11) Document Baseline Vitals

(a) Respiratory Rate

(b) Pulse Rate

(c) Estimated blood pressure

(12) Reassess Responsiveness / AVPU.

(13) TACEVAC Accordingly.

(a) Consult with Corpsman prior to evacuating casualties

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Notes

GLOSSARY

alveoli A tiny, thin-walled, capillary-rich sac in the lungs where the exchange of oxygen and carbon dioxide take place.

ambulatory The ability to ambulate; to walk.

anterior Toward the front side of the body.

auscultate To examine by listening; to hear.

AVPU System used to describe the casualty's level of consciousness. A = alert, V = verbal stimulus, P = painful stimulus, U = unresponsive.

body substance isolation (BSI) A practice of isolating all body substances (blood, sweat, urine, feces, etc.) to reduce or eliminate the spread of illnesses and diseases. Common BSI would include: gloves, masks,
and safety goggles.

Bolinchest seal A brand-name type of occlusive dressing that is used to alleviate or prevent a tension pneumothorax. The three-way valve is designed to allow air and blood to escape from the thoracic cavity and prevent the re-entry of either.

carotid pulse The pulse, or heart rate, that may be obtained by feeling on the carotid arteries, which are located on the side of the neck. This pulse can also have an estimated blood pressure value of 60/P.

contraindication A symptom or condition that makes a medical treatment or procedure inadvisable.

CUF Care Under Fire. This refers to the first phase of Tactical Combat Casualty Care (TCCC).

diaphragm The primary muscle of respiration. The organ that separates the thoracic and abdominal cavities.

distal Away from the point of origin or away from the body.

femoral pulse The pulse, or heart rate, that may be obtained by feeling on the femoral arteries, which

are

located on the inside of the groin. This pulse can also have an estimated blood pressure value of 70/P.

fracture A break in the body's bones. May be classified as "open", where the bone breaks through the skin, or as "closed", where the bone is broken but the skin remains intact.

hemorrhage Bleeding; also, loss of a large amount of blood in a short period, either inside or outside of the body.

hypothermia A condition that is caused by the decrease of the body's core temperature below 95 degrees. This condition may be caused due to loss of blood or prolonged exposure to a cold environment.

IAP An acronym used to assess all chest injuries. I = inspect, A = auscultate, P = palpate.

mediastinum Middle of the thoracic cavity containing the heart, great vessels, trachea, mainstem bronchi, and esophagus.

musculoskeletal Relating to or involving the muscles and the skeleton.

nasopharyngeal airway (NPA) Airway that is placed in the nostril and follows the floor of the nasal cavity directly posterior to the nasopharynx. This airway is usually tolerated well by casualties with a gag reflex.

needle thoracentesis A procedure where a needle and catheter are inserted into the chest wall and into the pleural space. This provides a conduit for the release of accumulated pressure. The procedure reduces pressure on the heart, lungs, and major vessels in the thoracic cavity due to a tension pneumothorax.

occlusive dressing An air and water-tight trauma dressing that provides a total seal, and do not have the absorbent properties of gauze. They are typically used to treat open, or "sucking", chest wounds to alleviate or prevent a tension pneumothorax.

palpate To examine by touch; to feel.

pedalpulse The pulse, or heart rate, that may be obtained by feeling on the dorsalis pedis arteries, which are located on the top of the feet. This pulse can also have an estimated blood pressure value of 90/P.

perfusion Fluid passing through an organ or a part of the body. Also, the surrounding and bathing of a tissue or cell with blood or fluid parts of the blood which helps supply the organs and tissues with oxygen and nutrients.

peripheral The outward part or surface of a structure.

posterior Toward the back, or rear, side of the body.

pressure dressing A compression dressing that can be created using gauze pads and an elastic roller bandage, or more specifically, the Cinch-Tight or "H"-bandage. This bandage is placed directly over a non-life threatening (venous) hemorrhage.

radial pulse The pulse, or heart rate, that may be obtained by feeling on the radial arteries, which are located on the inside of the wrist. This pulse can also have an estimated blood pressure value of 80/P.

SAM splint A formable splint that can be molded into various shapes to accommodate the shape of the injured extremity. Formable splints are best used for ankle, wrist, and long-bone fractures.

shock Widespread lack of tissue perfusion with oxygenated red blood cells that leads to anaerobic metabolism and decreased energy production.

TCCC Tactical Combat Casualty Care.

tension pneumothorax Condition occurring when the air pressure in the pleural space exceeds the outside atmospheric pressure and cannot escape. The affected side becomes hyperinflated, compressing the lung on the involved side and shifting the mediastinum to partially collapse the other lung. A tension pneumothorax is usually progressive and is

an

imminently life-threatening condition.

tourniquet A constricting or compressing device used to control venous and arterial bleeding to an extremity. Tourniquets are used in emergency bleeding control to prevent severe blood loss from limb trauma.

APPENDIX A

CLS BAG

APPENDIX A is comprised of the contents of the CLS bag and various uses of the medical gear.

ITEM IDENTIFICATION	ITEM USES
Nasopharyngeal 22FR	Airway management
Nasopharyngeal 26FR	Airway management
Big Cinch Abdominal Dressing	Treat abdominal wounds
H and H Compression Gauze	Treat by packing wounds, securing SAMS Splints
Combat Gauze	Hemostatic agent for bleeding wounds
Triangular Bandage	Sling andSwath, securing splints
Water Jel	Treat burn injuries
Bolin Chest Seal	Treat sucking chest wounds
"H" Bandage	Treat bleeding wounds, abdominal wounds
Gloves	BSI
Needle, Decompression	Chest decompression
Alcohol Pads	Clean sites for Decompression
Shears, Trauma	Removal of clothes
SAMS Splint	Splinting extremities
4 x 4 Gauze	Treat bleeding wounds
Strap Cutter	Removal of boots
Tape	Securing items
CAT Tourniquet	Massive hemorrhage control

Note: Items listed above can be used in multiple ways and not limited to items uses category.

APPENDIX B

INDIVIDUAL FIRST AID KIT (IFAK)

APPENDIX B is comprised of the contents of the IFAK and various uses of the medical gear.

ITEM IDENTIFICATION	ITEM USES
H and H Compression Gauze	Treat by packing wounds, securing SAMS Splints
Combat Gauze	Hemostatic agent for bleeding wounds
Triangular Bandage	Sling andSwath, securing splints
Water Jel	Treat burn injuries
“H” Bandage	Treat bleeding wounds, abdominal wounds
Gloves	BSI
Alcohol Pads	Clean sites
Band-Aids	Treat minor wounds
Tape	Securing items
Iodine	Cleaning sites, Water purification
CAT Tourniquet	Massive hemorrhage control

Note: Items listed above can be used in multiple ways and not limited to items uses category.