

# **Aviation Rescue Swimmer School**



Practical First Aid  
Lesson Topic 5.3

# Objectives

- Explain the purposes of First Aid.
- List the different types of injuries and the appropriate treatment for each in accordance with the lesson plan.

# TOPIC OUTLINE

Purpose of first aid for Rescue Swimmers:

- Save life
- Prevent further injury
- Prevent infection
- Treat for shock

# Basic Principles of First Aid:

- Act quickly, but effectively.
- Reassure the survivor in a calm manner.
- Reveal only enough of the survivor's injuries to ensure cooperation.
- Do not discuss the survivor's injuries with others while the survivor is in hearing range unless you're uncertain about an injury or course of treatment.
- If survivor is in danger of further injury, remove them from the danger as quickly and smoothly as possible, without putting yourself at risk.

# First Aid Procedures

- Treatment begins once access to the survivor has been established.
- During an overland SAR, perform the Primary Survey only. This is a “Load and Go” situation.
- During an in-water SAR, First Aid treatment begins in the rescue platform.
- All SAR capable aircraft utilize the Level “A” Medical Kit. The first step in the treatment of injuries is protecting yourself from bodily fluids as much as possible. Always utilize the surgical gloves found in the Level “A” Medical Kit at a minimum.

# Wounds:

There are 5 classification of wounds:

# Classification of Wounds

## Bruise





# Scrape/Abrasion



# **Laceration (torn/ragged edges) and Incision (smooth edges).**



# Avulsion

Skin tissue partially or completely torn away with severe bleeding possible.







# Puncture

Most susceptible to infection.







# Wounds

- Infection is secondary to a wound. Never close or bandage a wound until it has been irrigated or cleaned out as much as possible.
- If severe bleeding is present, do not worry about cleaning out the wound, control the bleeding.

# Open Wounds

- Three types of bleeding:
  - Arterial : Large vessels that carry blood away from the heart. Bleeding is *bright red* and *spurts* from the wound.
  - Capillary : Small vessels that carry blood to all body parts. Bleeding is *slow* and *oozes* from the wound.
  - Venous : Veins carry blood to the heart. Bleeding is *dark red* and flows in a *steady stream*.

# Dressings and Bandages:

- Dressings: pads placed directly on the wound to soak up blood and keep germs out. These will not stick to the wound.
- Bandages: used to wrap and hold dressings in place, apply pressure to help control bleeding, and help support an injured body part. Bandages include: Band-Aids, Triangle bandages, and Roller bandages made of gauze or elastic material.
- Field Dressings are a combination Dressing and Bandage in one.

# Control severe bleeding using the following methods:

## Direct Pressure

Place direct pressure on the wound using a sterile field dressing.

A dressing may be created using any available equipment as necessary.



# Control severe bleeding

- Elevation– elevate the affected extremity above the level of the heart.

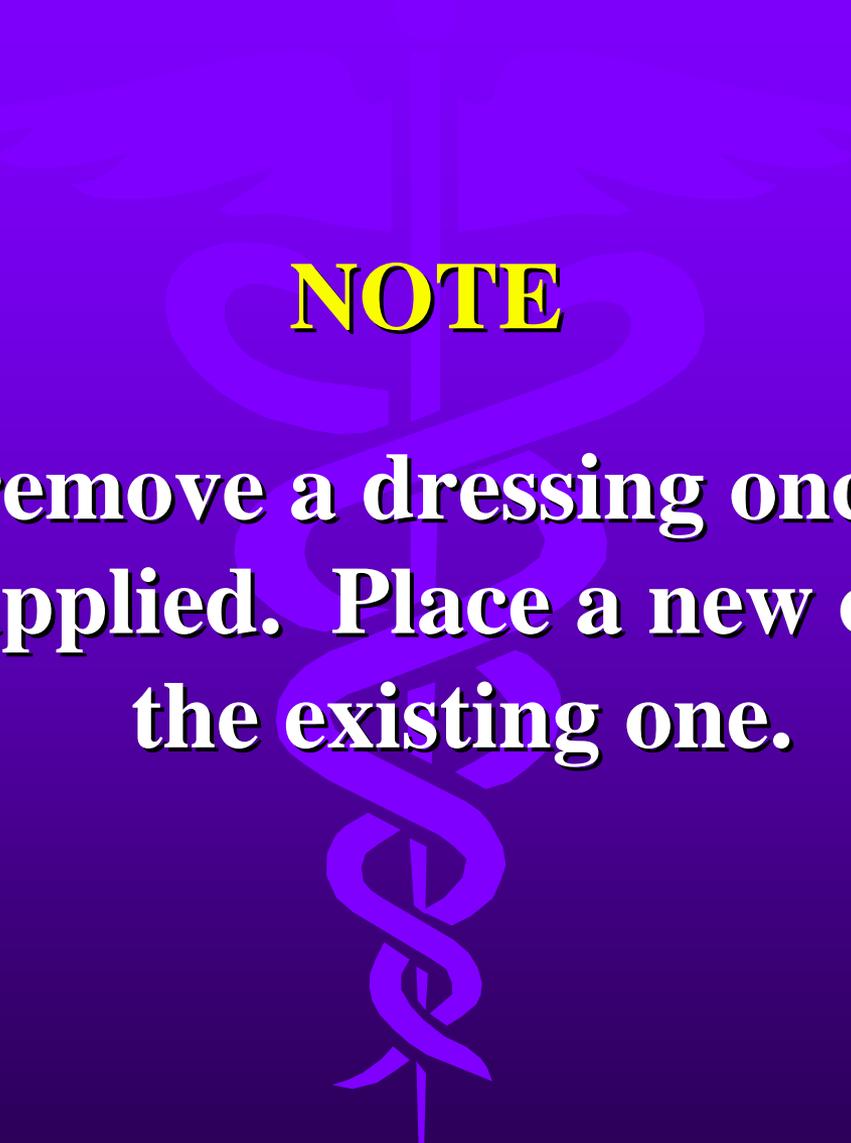
## NOTE

Do not elevate an extremity until it has been properly splinted if a fracture is suspected.

# Second Dressing

- Apply a second dressing if first bandage becomes blood-soaked. Wrap dressings in place with a roller bandage as needed. Ensure bandage is tied off or taped to prevent loosening.





## **NOTE**

**Never remove a dressing once it has been applied. Place a new one over the existing one.**

# Pressure Points

- Apply pressure to the artery by pressing against the underlying bone at a point closest to the wound and midway to the heart.



# Tourniquet:

- Used as a last resort.

## NOTE

Never remove a dressing once it has been applied. Place a new dressing over the existing one.

- When you use a tourniquet, you risk sacrificing a limb in order to save a life.



# Tourniquet:

- Tourniquets are only placed on the extremities (arms and legs). Normally placed 1 to 1.5 inches above the wound.
- If possible, place the tourniquet below a joint.
- Write the time and location of the tourniquet on the front of survivor's shirt.
- Write a capital "T" on the survivor's forehead.
- Leave the tourniquet visible.
- **Never** use string, wire, or any thin material less than one inch wide.
- Tighten only enough to control bleeding.
- **Never** loosen a tourniquet once it is in place.

# Warning

When practicing on a simulated survivor do not tighten a tourniquet!

# Signs of Internal Bleeding:

- Tender, swollen, bruised, or hard areas of the body (i.e.: the abdomen).
- Rapid, weak pulse.
- Skin that feels cool, moist or looks pale or bluish.
- Vomiting or coughing up blood.
- Excessive Thirst.
- Becoming confused, faint, drowsy, or unconscious.

# Shock:

A life-threatening condition usually due to severe bleeding and caused by a lack of blood circulating throughout the body.

# Signals of Shock:

- Restlessness or irritability (often the first indication).
- Altered level of consciousness.
- Pale, moist, cool skin.
- Rapid breathing.
- Weak, rapid or absent pulse.

# Late Stages of Shock:

- Bluish coloration around the lips, eyes, and/or the nail beds due to a prolonged lack of oxygen.
- Loss of consciousness.
- No breathing or absent pulse.

# Shock:

All survivor's will be in some form of shock. Position survivor for transport in the rescue vehicle in one of the following five positions:

## NOTE

Maintain in-line stabilization of the head and neck if a head, neck, or spinal injury is suspected.

# Traditional Shock Position:

- Use this position unless the survivor's injuries preclude it (if no other shock position is needed).
- Feet are elevated 6"-12" inches above the level of the heart.
- When spinal injuries are suspected, lift the foot end of the SAR litter instead of the feet.



# Flat on Back Position

- Use when head injury is suspected, the survivor has an eye injury, flail chest, signs of internal bleeding in the abdomen or torso are present, or the survivor is unconscious upon your arrival.
- Position the survivor on their back, keeping the body as straight as possible.

# Side Position

- Used for survivor with nausea and vomiting, bleeding from the mouth, large amounts of oral secretions, a sucking chest wound, deviated trachea, or compressed air injury is suspected.
- Place survivor with an open or closed chest wound, injured side down. This position allows gravity to assist in drainage of blood and keeps the uninjured lung up.
- If a compressed air injury is suspected, place the survivor left side down to keep air bubbles from forming in heart vessels.

# Knee's Flexed Position

- Used for a survivor with abdominal injuries. (Something going into or coming out of the abdomen.) This position does not include internal bleeding in the abdomen.
- Lay survivor on their back and raise their knees to approximately 45° angle. This will ease tension on the abdominal muscles.

# Semi-Seated Position

- Not to be used if you suspect head, neck, or spinal injuries, or the survivor has ejected.
- Used for survivors with medical problems such as a heart attack or trouble breathing.
- Position the torso at a 45° angle with legs flat.

# NOTE

Survivor should be placed in the appropriate shock position upon completion of the Secondary Survey if feasible.

# Head, Neck, and Spinal Injuries:

- Only an x-ray can truly determine internal head, neck, or spinal injuries. Suspect a head, neck, or spinal injury when:
  - Fall from height greater than the survivor's height.
  - Any diving (head first) mishap.
  - Any person found unconscious for unknown reasons.
  - Any injury involving severe blunt force to the head or trunk.
  - Any injury that penetrates the head or trunk.
  - Any person thrown from a motor vehicle or not wearing a seat belt.
  - Any injury in which the victim's helmet is broken.
  - Lightning strike.
  - Ejected Aircrew.

# Signals of Head, Neck, and Spinal Injuries:

- Change in level of consciousness.
- Complaints of severe pain or pressure in the head, neck, or back.
- Tingling or loss of sensation in the hands, fingers, feet, or toes.
- Partial or complete loss of movement in any body part.
- Unusual bumps or depressions on the head, neck, or spine.

# Signals of Head, Neck, and Spinal Injuries

- Blood or other fluids in the ears or nose.
- Heavy external bleeding of the head, neck, or back.
- Seizures.
- Impaired vision or loss of balance as a result of injury.
- Bruising of the head, especially around the eyes and/or behind the ears.

# Treatment of Head, Neck, and Spinal Injuries in-water rescue:

- Treat all unconscious survivors or ejected aircrew as possible head, neck, and/or spinal injuries.
- Upon gaining access to the survivor and establishing ABC's are present, perform all necessary disentanglement procedures and stabilize the spine utilizing the SAR MEDEVAC litter as required.
- This may prevent a potentially life threatening or permanent neurological injury from occurring.
- As a Rescue Swimmer, you're goal is to get the survivor into the rescue platform as quickly and effectively as possible.

# WARNING

In a water rescue situation, the survivor may be placed in a litter and hoisted horizontally to prevent the effects of hydrostatic squeeze.

# Hydrostatic Squeeze

- Water exerts pressure on a body immersed in it. This effect is called hydrostatic squeeze.
- Vertical removal from the water relieves the pressure and causes blood to flow back to the lower extremities increasing the level of shock.

# Treatment of Head, Neck, and Spinal Injuries

## OVERLAND RESCUE

- Treat all unconscious survivors or ejected aircrew as possible head, neck, and/or spinal injury.
- Upon gaining access to the survivor and establishing ABC's are present, immediately take control of the head and apply a cervical collar.
- Complete a Primary Survey by treating all life threatening injuries, log-roll the survivor onto the SAR MEDEVAC litter, and transport using litter-carry harnesses.

# Treatment of Head, Neck, and Spinal Injuries

## OVERLAND RESCUE

### NOTE

Check for pelvic fracture prior to logrolling survivor.

If a fracture is suspected, splint prior to logroll to avoid causing further injuries.

- If ABC's are not present, perform one minute of CPR and immediately logroll the survivor onto the litter and get them onto the rescue platform ASAP.

# Rescue Litter Procedures

- Requires both a Lead and an Assistant Rescuer.
- Lead will establish ABC's, while the Assistant takes in-line stabilization of the head. Assistant will verbally direct the movement of the survivor during transfer to the litter.
- Lead will apply the cervical collar and conduct a Primary Survey treating all life threatening injuries.
- Lead will position the litter next to the survivor and position themselves perpendicular to the survivor's hips.
- On the Assistant's 1...2...3 count, lead will grip the survivors hips, log-roll the survivor toward them, and check the back for injuries.
- The survivor is then rolled onto the litter and secured inside the litter straps.

# Fractures and Dislocations

- A fracture is a complete break, chip, or crack in a bone; classified as open or closed.
  - Open fractures: involve open wounds. Any wound in which bone is seen or exposed is an open fracture.
  - Treat the wound first. Stop the bleeding.
  - Do not attempt to set a broken bone.





# Closed Fractures:

- A closed fracture is a broken bone without an open wound.
  - Splint in place.
  - Do not attempt to set a broken bone.



# Dislocations:

- The separating of bones between a joint.
- May be very painful. Splint in place unless circulation below the joint is compromised.



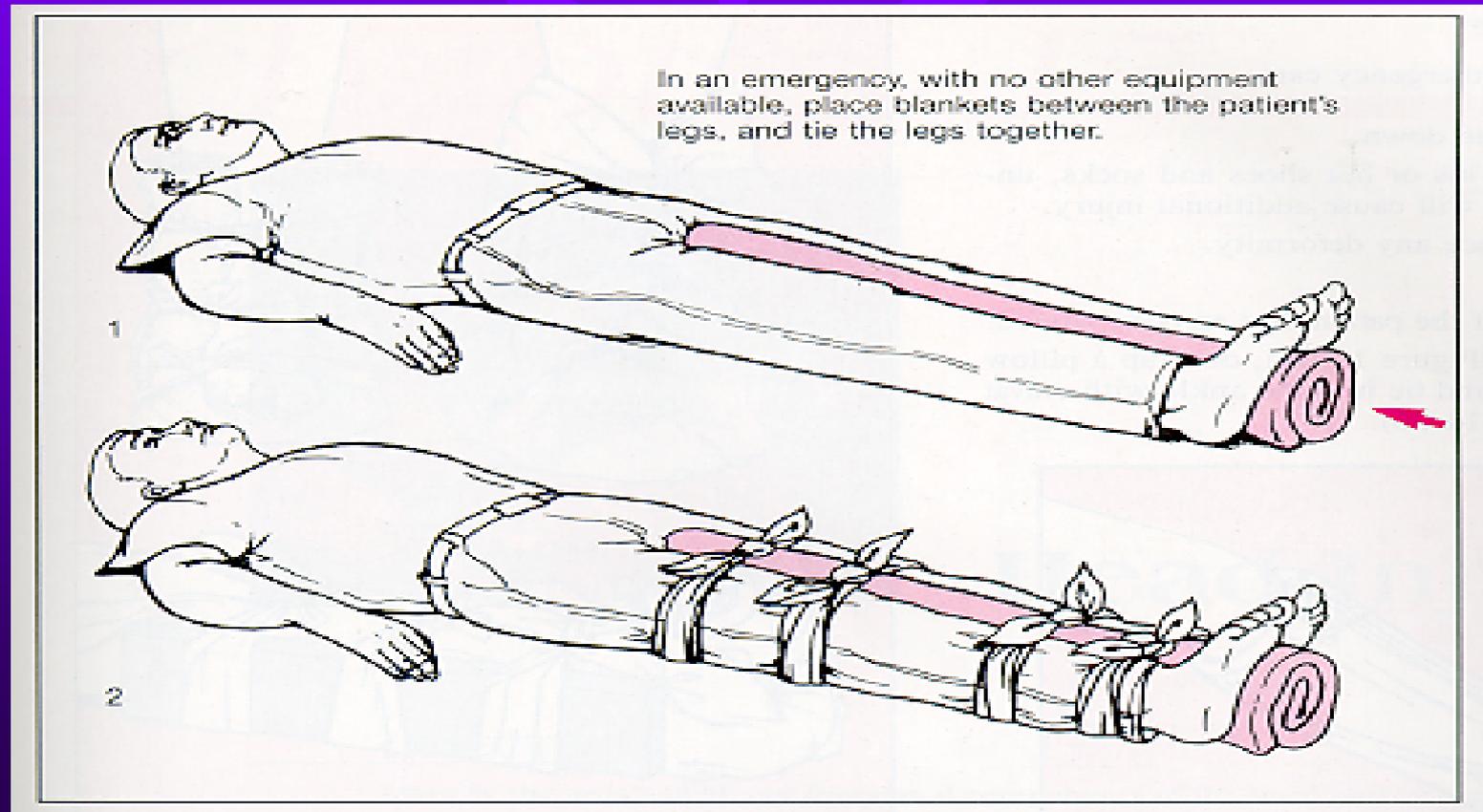
# Splinting:

Soft



# Splinting:

## Anatomical



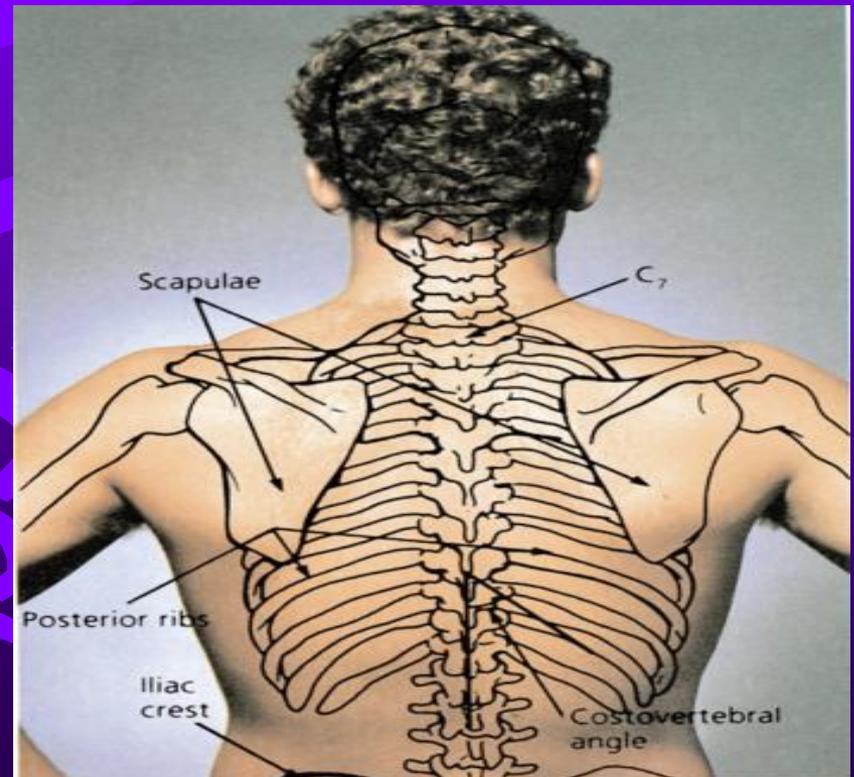
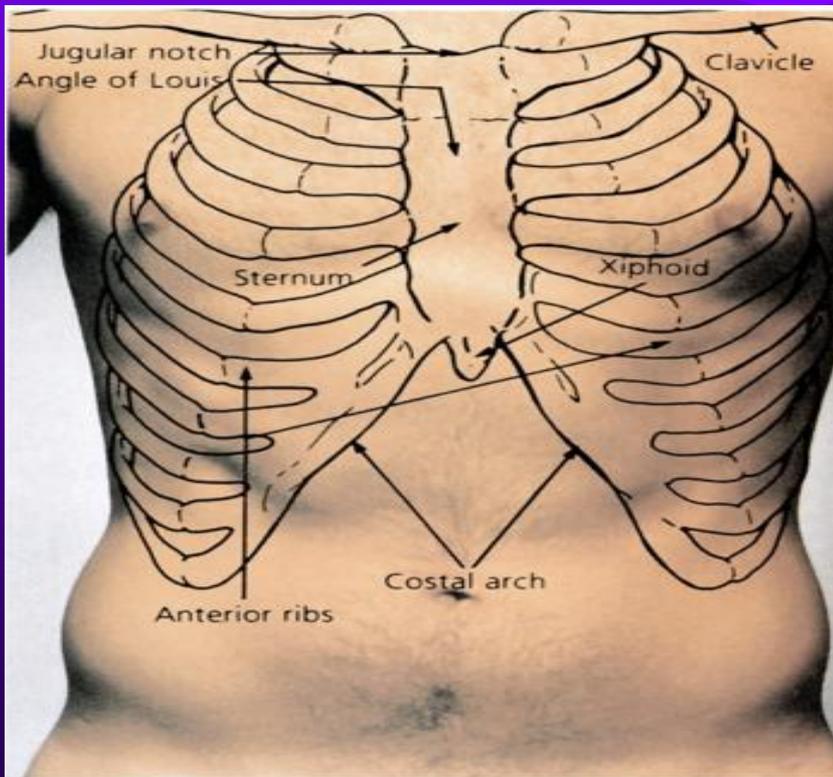
# Splinting:

- Splinting is done during the Secondary Examination. After splinting an extremity, always check for a capillary refill to ensure proper circulation.
- If circulation is compromised or the injured extremity cannot be placed into the litter appropriately, it may be necessary to move the extremity to an in-line position.



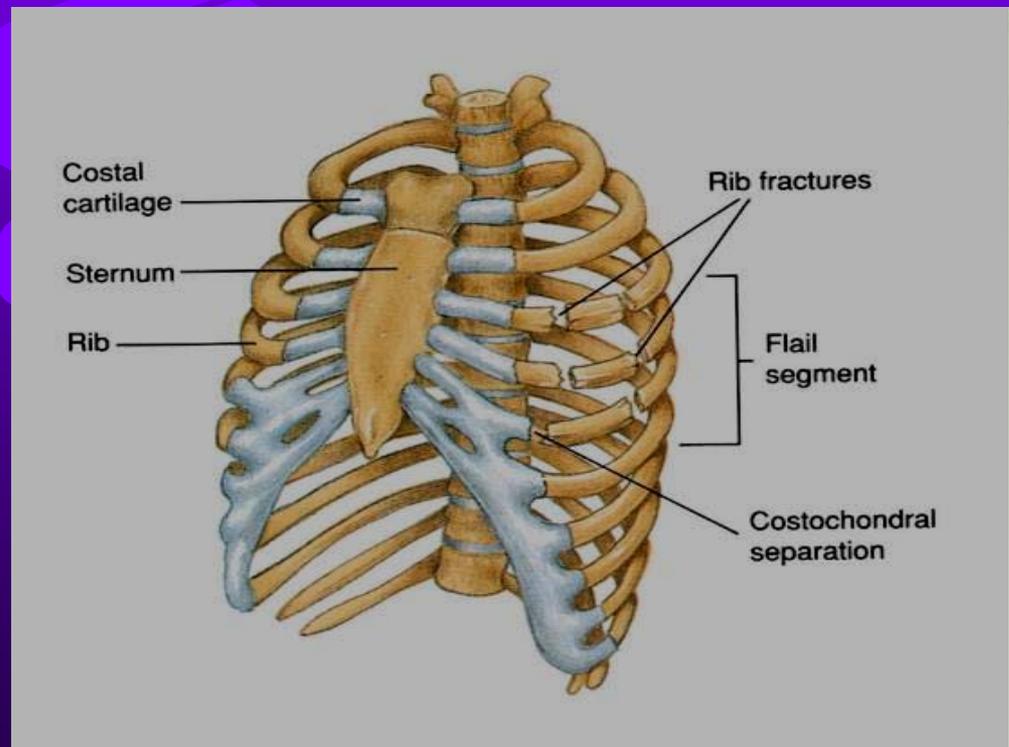
# Rib Fractures

- Simple - 1 or 2 ribs broken, can be in several places.



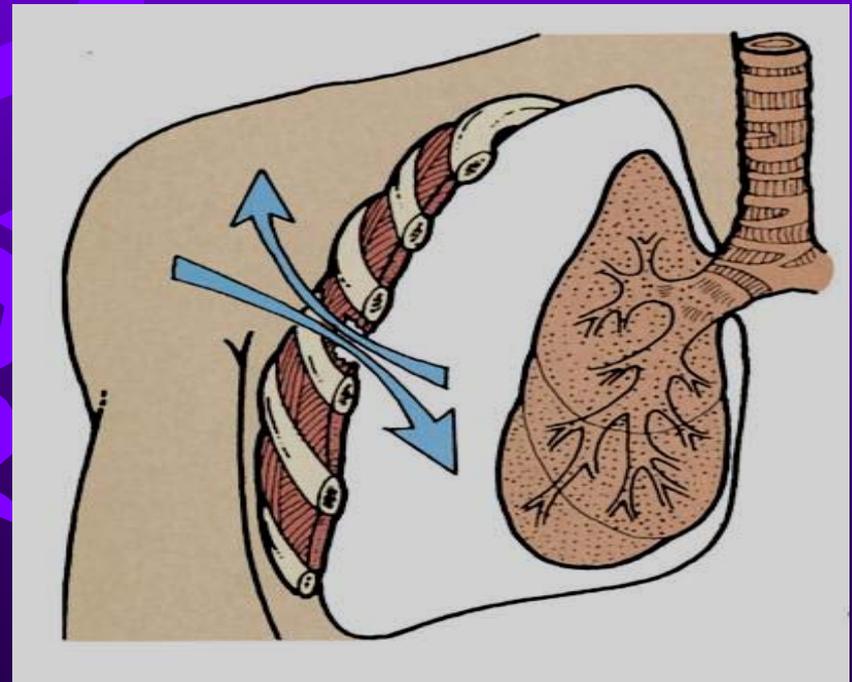
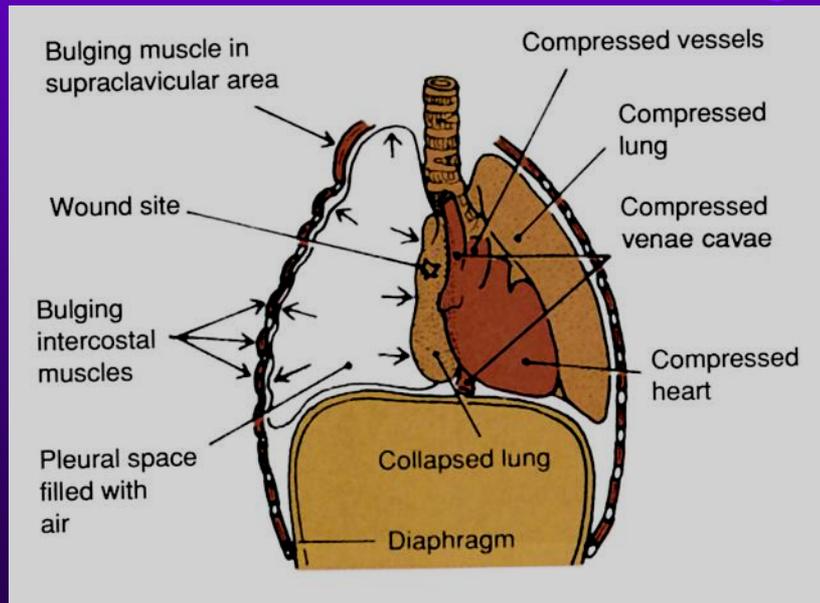
# Rib Fractures

- Flail Chest - 2 or more consecutive ribs broken in 2 or more places. Usually recognized by a section of the rib cage moving opposite of the normal breathing pattern.



# Open & Closed Chest Wounds

- Open Chest Wound- also known as a “sucking chest wound,” occurs when air leaks into the chest cavity from an opening in the chest wall.
- Due to increased air pressure outside of the body, the air is drawn into the chest as the survivor exhales, and causes the lung to collapse.



# Closed Chest Wound:

- Occurs due to a puncture in the surface of the lung causing an increased air pressure in the chest cavity and forcing the lung to collapse. May be identified by the presence of a deviated trachea.



# **Abdominal Evisceration:**

Extensive laceration to the abdominal wall causing some of the internal organs to push out.





# Pelvic Fractures:

- The upper body rests on the spine connected to the pelvis. The legs are seated in the pelvic girdle. Essentially, the pelvis is the center of the body.
- A survivor with a pelvic fracture will feel like they are coming apart and may be in extreme pain.
- Gently press downward and inward against the hips to test for movement, grinding, and survivor response to pain.

# Burns

- Burns result from heat, electricity, chemicals, and radiation.
- Burns are determined by the depth of tissue damage:
  - 1st Degree (Superficial) - A sunburn. Involves the top layer of skin.



# Burns:

- 2nd Degree (Partial Thickness) - Recognized by the blisters.



# Burns

- 3rd Degree (Full Thickness) - All layers of skin and most or all underlying structures are destroyed. Identified by black or white charred tissue.







# Burns

- Steps for care:
  - Assess the scene and remove the victim from the source.
  - Cover with a loose, dry, sterile dressing.
  - **Do not** use ointments or petroleum products on the burn.

# Critical Burns

- Any burn that:
  - Involves difficulty breathing.
  - Covers more than one body part.
  - Involves the head, neck, hands, feet, or genitals.
  - Results from chemicals, explosions, or electricity.

# Environmental Injuries - Heat Related Injuries:

- Heat Cramps - painful muscle spasms, usually in the legs or abdomen.
- Care includes:
  - Laying the victim down in a cool place.
  - Give cool water or **moderate** amounts of commercial sports drinks.
  - Light stretching of affecting muscles may help.
  - Do not give salt or salt tablets, as they may worsen the condition.

# Heat Related Injuries

- Heat Exhaustion - more severe condition of heat cramps.
- Signals include:
  - Normal to sub-normal skin temperature. Skin may cool, moist, pale, or flushed.
  - Headache.
  - Nausea/Vomiting.
  - Weakness and Fatigue/Exhaustion.
  - Care is the same as Heat Cramps.

# Heat Related Injuries

- Heat Stroke - the least common, but most severe heat emergency.
- Signals include:
  - Red, hot, dry skin. Sweating has greatly reduced or has stopped.
  - Change in level of consciousness (may be disoriented).
  - Rapid, weak pulse.
  - Rapid, shallow breathing.

# Care for Heat Stroke:

- Cool the survivor immediately. Apply ice or cold packs to the wrist, ankles, groin, armpits, and neck. These areas are where heat is retained and the arteries are the most shallow.
- Ice or cold water baths are a last resort, as they may trigger dangerous heart irregularities.
- **Do not** apply rubbing (isopropyl) alcohol.

# Environmental Injuries - Cold Related Injuries:

- Hypothermia – condition where the body core temperature drops because of a failure to keep warm.
- Signals include:
  - Shivering- most important indicator regarding the survivor's condition.
  - Numbness
  - A glassy stare
  - Apathy - loss of hope
  - Loss of consciousness

## NOTE

Even in warm water, hypothermia is a life threatening condition.

# **Environmental Injuries - Cold Related Injuries:**

## **NOTE**

Even in warm water, hypothermia is a life threatening condition.

# Care for Hypothermia:

- Remove any wet clothing and dry survivor.
- Gradually re-warm by wrapping in blankets and dry clothing (if available).
- Move survivor to a warm place.
- Buddy warming may be necessary for survival.
- Never rapidly re-warm the survivor, this may trigger dangerous heart irregularities.



# Compressed Air Injuries:

- May occur anytime a survivor breathes compressed gases underwater.
  - Helicopter Emergency Escape Device Systems (HEEDS).
  - Seat Pan Oxygen.
  - Self Contained Underwater Breathing Apparatus (SCUBA).

# Compressed Air Injuries

## Air Embolus and Decompression Sickness (DCS or “bends”)

- Breathing compressed air underwater causes gases to be absorbed into the blood.
- Rapid ascent relieves pressure on the gases, causing them to come out of solution.
- Air Embolus and DCS are caused by gas bubbles which expand during ascent. These can either block blood vessels, become trapped within joints, or they may travel between tissues.

# Compressed Air Injuries

The following symptoms may be present  
(depending upon the location of the bubble):

- Disorientation or personality change.
- Dizziness or blurred vision.
- Numbness, Tingling, or Paralysis.
- Chest pain.
- Blood froth from mouth or nose.
- Convulsions.
- Coughing or shortness of breath.
- Unusual fatigue or weakness.
- Skin itch.
- Pain in the arms, legs, or torso.

# Treatment of Compressed Air Injuries

- Both Air Embolus and DCS require urgent recompression. Transport the survivor to capable facilities ASAP.
  - Unpressurized aircraft fly at lowest safe altitude and limit altitude changes.
  - Ensure Aircraft Commander contacts Hyperbaric Chamber before arrival.
  - Administer CPR/Rescue Breathing as required.
  - Keep airway open. Survivor may vomit.
  - Keep survivor lying (left side down) and quiet. This position causes bubble(s) to rise away from heart.



# Dead-On-Arrivals (DOA'S)

- Treat the victim as humanely and gently as possible. Recovery is necessary for autopsy investigation and proper burial.



# Psychiatric Emergencies

- A sudden onset of behavioral or emotional responses that, if not responded to, may result in a life-threatening situation. In almost all cases, First Aid treatment is a calm, professional, understanding demeanor without aggravating the survivor.

# Review

- State the purpose of First Aid?
  - *Save life, prevent further injury, prevent infection, treat for shock.*
- Name the five classifications of wounds?
  - *Bruise, Scrape/Abrasion, Laceration, Avulsion, Puncture.*



**Questions...?**

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