Shots Fired

Introduction to Tactical Combat Casualty Care

Disclaimer

- This 2 part course demonstrates certain life saving techniques utilized by police/armed services to preserve life in the event of severe penetrating trauma that can freely be viewed on-line

- It does not authorize you to expand your scope of practice

For Me?

- Some of the things we teach are immediately possible and already built into BLS
- Some of the things will need department support
- All of the things can be downloaded online
- 95% of the equipment we use can be bought without restriction

Goals

- Goals
  - Save yourself
  - Save your team
  - Evacuate safely

Things That Kill

M-A-R-C-H

- Massive Hemorrhage
- Airway
- Respirations
- Circulation
- Hypothermia

What Will We Learn

- M - CAT1 Tourniquet Use
- A - Nasopharyngeal Airway Placement
- R - Needle Decompression
- C - Battlefield Dressing
- (H – Cover)
- Tactical Evacuation

General Principles

1. Take cover
2. Direct others to do same
3. Self-administer care
4. Plan evacuation of yourself and others
    1. Be ready to go
    2. Survive in the mean time

General Principles

- Don’t try to treat yourself or your casualty in the Kill Zone!
- Suppression of enemy fire and moving casualties to cover are the most important factors
- The best medicine on the battlefield is Fire Superiority
  - Will be provided to you at times “cover fire”

Principles

- Once out of the kill zone - address medical issues that will kill you prior to evacuation

  - Stop life-threatening external hemorrhage if tactically feasible is always the first priority (MARCH)

Principles

- Don’t take time to establish an airway (No more ABC)
- Defer airway treatment until you have moved to cover
- Hemorrhage is the greatest threat to life
- If casualty has no airway or respirations the chances for survival are minimal
- CPR is not indicated on the battlefield

Ongoing Care

- Re-inspect for bleeding control and treat as needed
- Conduct an assessment of casualty to identify all wounds – treat as you go
- Prepare as a “package” for evacuation and be ready to move
- Casualties who have lost blood must be kept warm (hypothermia)

Tactical Field Care Summary

- Simultaneously preparation of casualty for evacuation
- Be prepared to move on short notice
- Constantly re-inspect treatments and patient status
- Changes in status change evacuation priority
- Transfer information to next level of care
- Keep patient warm

Tactical Combat Casualty Care Summary

- The three leading preventable causes of death on the battlefield that FIRST is focused on reducing are:
  - Uncontrolled hemorrhage
  - Tension pneumo-thorax
  - Simple Airway Obstruction

- As the combat situation changes, your treatments change

Hemorrhage Control on the Battlefield

Hemorrhage Control – Stop the Bleeding

- Early control of severe hemorrhage is critical
  - Extremity hemorrhage is the most frequent cause of preventable battlefield deaths
  - Over 2500 deaths occurred in Vietnam due to hemorrhage from extremity wounds
  - Injury to a major vessel can quickly lead to shock and death

Hemorrhage Control
Frequently Asked Question

- How long does it take to bleed to death from a severed femoral artery?

- Answer:
  – Casualties with such an injury can bleed to death in as little as 3 minutes

  Massive Hemorrhage is regarded as 150ml/ minute

Hemorrhage Control

- When a tourniquet can be applied, it is the first choice for to control massive bleeding in extremity wounds for combat casualties

Hemorrhage Control
Frequently Asked Question

- If I put a tourniquet on a casualty, is he going to lose that limb?

- Answer: No. The amputations that occur in combat are generally due to the degree of damage and not the tourniquet use.

Tourniquet Function Principles

- Tourniquet must occlude artery in both an arm and a leg (stop pulse and blood flow)
- Tourniquet must be locked into place once tightened to prevent accidental release
- The band or strap that is routed around the extremity should be at least one inch wide
- Tourniquets do not work on or near joints
- Tourniquets can be improvised but it takes time to do so

Tourniquet Application Principles

- Identify the injury: massive bleeding from arm or leg
- Put tourniquet on above the wound and tighten (take out the slack)
- Turn windlass rod or tourniquet device until bleeding stops
- Secure tourniquet (i.e windlass rod) for transport (no quick releases)
- Annotate time and monitor patient

Tourniquet Application Principles

- Apply above wound without delay to control massive bleeding in arms and legs
- Do not “treat in the street” – find cover
- The casualty, the person applying the tourniquet, and the entire element are in grave danger during Care under fire phase (i.e. while in a firefight)

Recommended Tourniquet

- The Committee for Tactical Combat Casualty Care recommends that all combat personnel should carry a C.A.T and be trained in its use
  - This tourniquet was designed to be applied with one hand in order to meet USSOCOM requirement
  - Firefighters should be able to easily reach their own tourniquet quickly

Combat Application Tourniquet

CAT1

CAT1

CAT1

CAT1

CAT1

CAT1

Tourniquet Application Principle

- DO NOT periodically loosen the tourniquet to get blood to the limb - Can be rapidly fatal
- Tourniquets are very painful
- If bleeding re-occurs after tourniquet is applied – attempt to retighten the tourniquet
- If bleeding still occurs or a pulse is present, you should apply another above first

Summary Tourniquet Application

- Immediately put on above extremity wound in order to control massive bleeding
- Tighten tourniquet until bleeding stops
- Mark time of application
- Do not loosen or remove without a medic
- Tourniquets are very painful

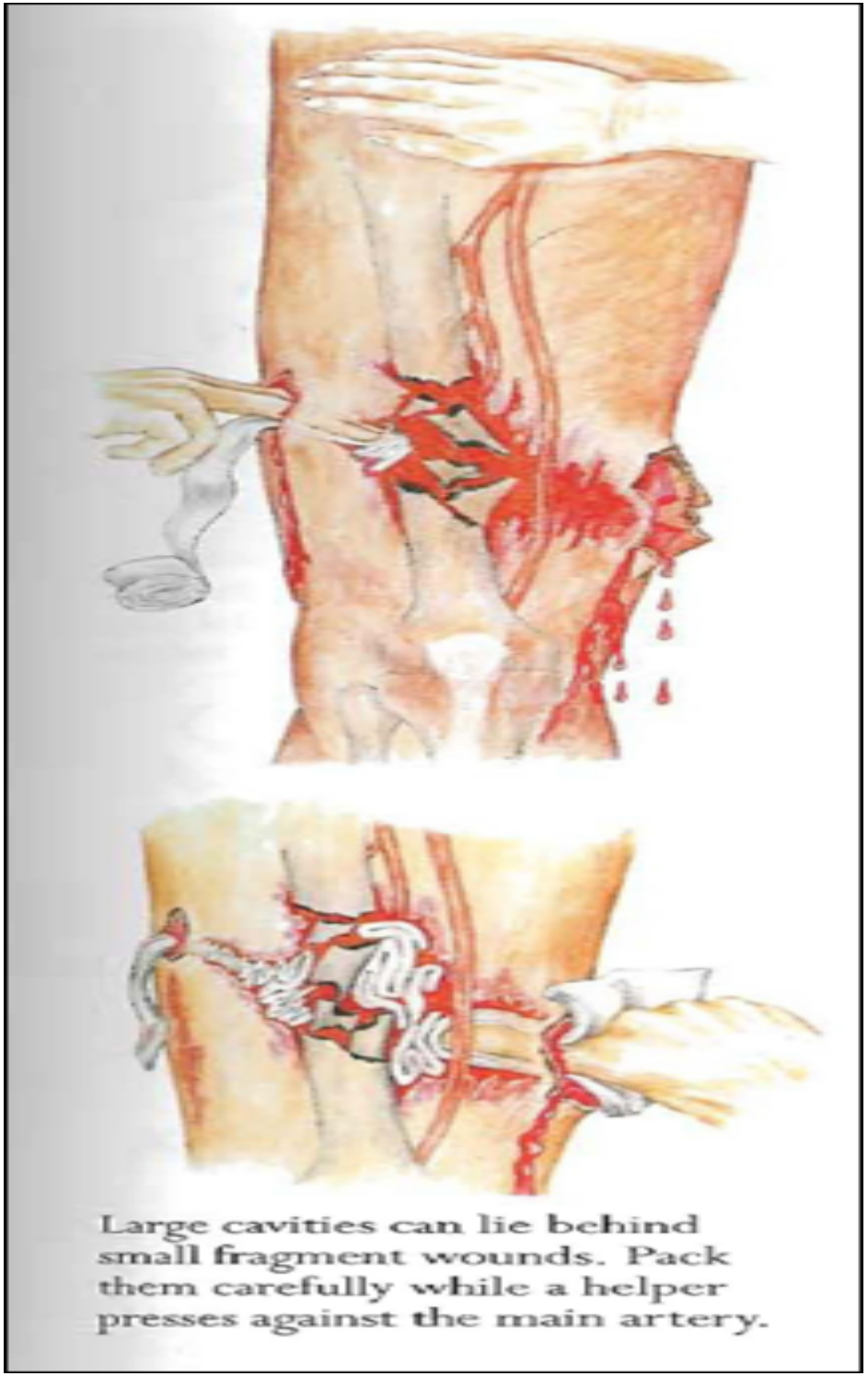
Some extremity wounds will not require a tourniquet

Wound Packing Principles

- Pack cavities that are bleeding to the bone (deep)
- Layer gauze in – do not stick in entire roll even into large cavities
- Create a pressure cone from the inside out and then apply a pressure bandage and hold pressure to control bleeding

Wound Packing Function

- Combat injuries form cavities of all shapes and sizes
- Packing gauze deep into these cavities creates a “pressure cone”
- Proper wound packing technique can control arterial bleeding in areas where you cannot use a tourniquet



Large cavities can lie behind small fragment wounds. Pack them carefully while a helper presses against the main artery.

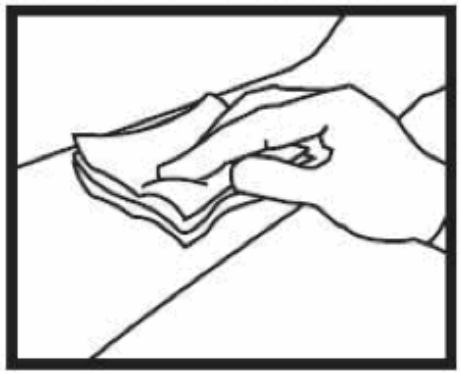
Example Wound Packed With Kerlix

Wound Packed with Kerlix

Trauma Bandages/Quik Clot

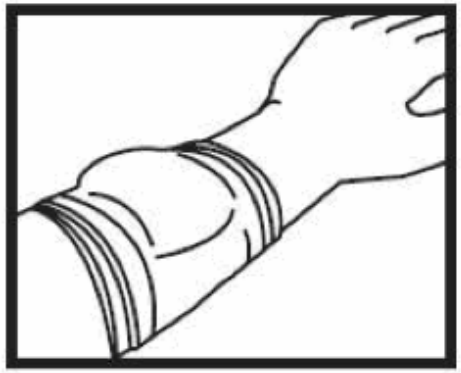
DIRECTIONS FOR USE

1. Open package and remove **Combat Gauze.** Keep the empty package.



2. Pack **Combat Gauze** into wound and use it to apply pressure directly over bleeding source. (More than one **Combat Gauze** may be required).

3. Continue to apply pressure for 3 minutes or until bleeding stops.



4. Wrap and tie bandage to maintain pressure. Seek medical care immediately. Show PRODUCT REMOVAL directions on package to medical personnel.

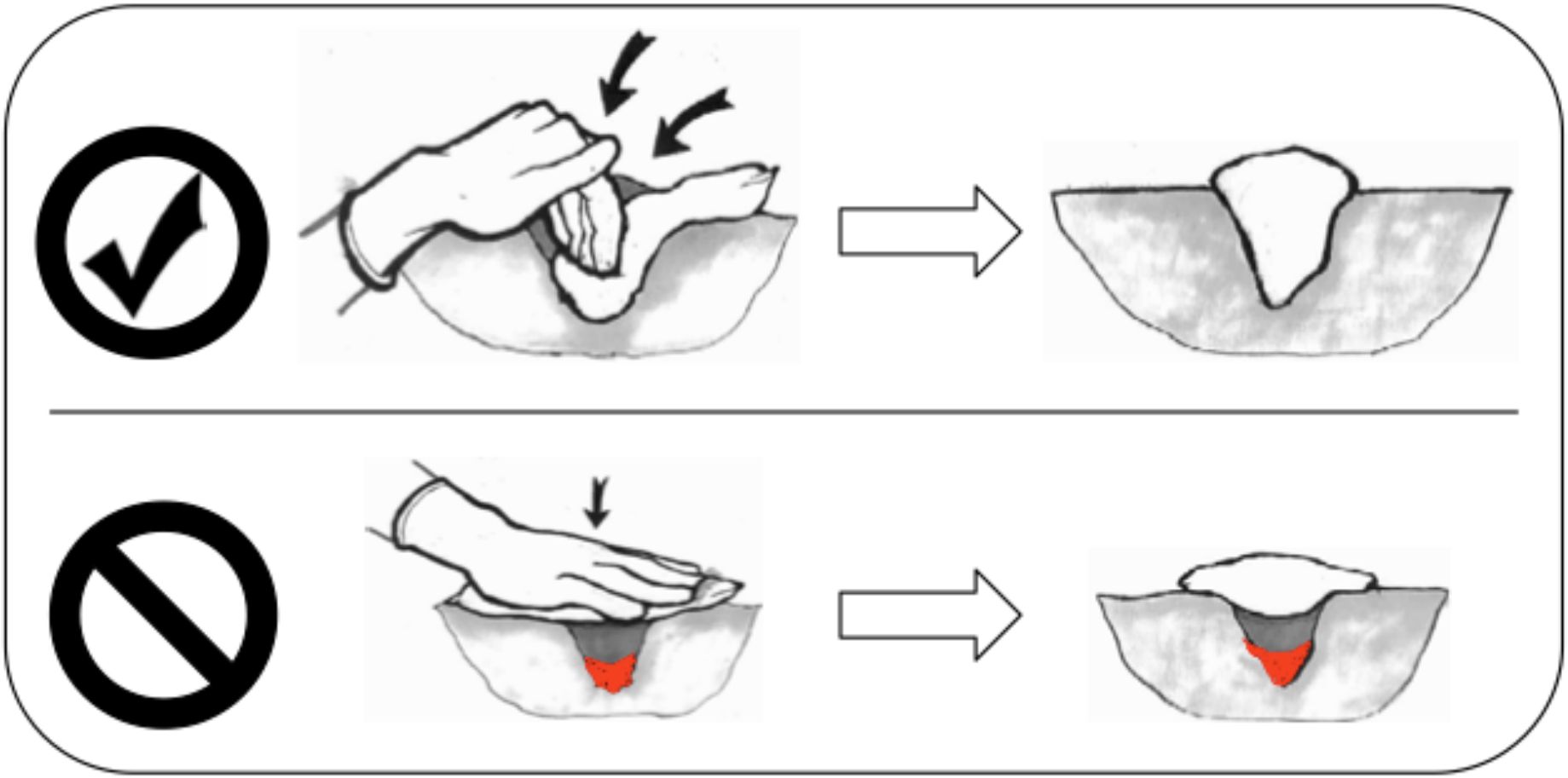
Tear open package of QuikClot® Combat Gauze™

Open clothing around wound. Remove excess pooled blood from wound, while preserving any clots already in the wound if possible.

Locate source of bleeding and pack QuikClot® Combat Gauze™ into wound. Use as much gauze as needed to stem blood flow. Remainder of roll can be used on top of wound or to wrap wound as injury requires.

Quickly apply pressure until bleeding stops.
Suggested time 3 to 5 minutes of continuous pressure.

Leave QuikClot® Combat Gauze™ in place. Wrap to secure the product in the wound.



Pressure Bandage Function Principles

- Pressure is an essential component to hemorrhage control
- Pressure on an artery above a wound can slow down or sometimes temporarily stop blood flow
- A pressure bandage is applied to help slow down bleeding so that the blood can clot – it is not meant to be a tourniquet
- Pressure bandages can be easily improvised

Pressure Bandage Application Principles

- Pressure is the key component in a pressure bandage - be prepared to improvise
- Place it on the wound, wrap it until it is effective, and secure it so it doesn’t come loose
- If applying a pressure bandage to a cavity, pack the cavity with gauze first to create pressure cone

Evacuation Principles for Hemorrhage Control

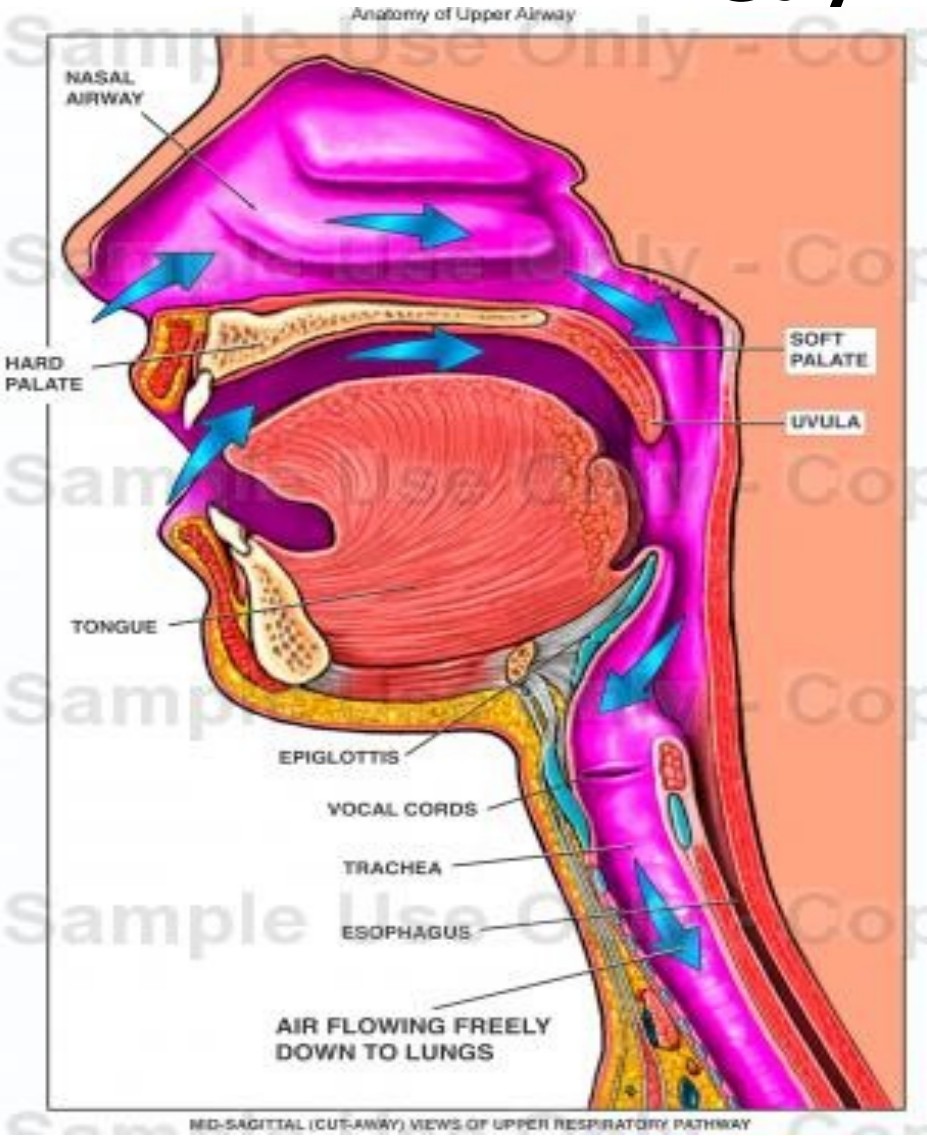
- Mark time of tourniquet application and transfer knowledge of treatment to evacuation asset
- Some bleeding you cannot see so monitor level of consciousness - decreases in level of consciousness or loss of radial pulse are categorized as urgent
- Tourniquet and hemostatic effectiveness must be constantly re-assesed during movement and evacuation

Hemorrhage Control Summary

- Apply tourniquet to control massive bleeding on arms and legs
- Use Combat Gauze in wounds that are massively bleeding but on which a tourniquet cannot be used
- Pack wounds in layers NOT rolls
- Use pressure dressings to secure treatments, help slow down bleeding, and treat minor wounds
- Know the equipment your unit is using, where it is located on each soldier and vehicle, and train to use it in the combat environment

Airway and Breathing

Airway Anatomy



Airway Principles

- When managing airway problems in combat the least invasive and simplest techniques work best
- Airways in casualties require constant monitoring and reassessments
- Inhalation airway burns and some trauma (i.e. blast and bleeding) can be very dangerous and must be identified quickly because they often require more advanced airway interventions

Airway Management

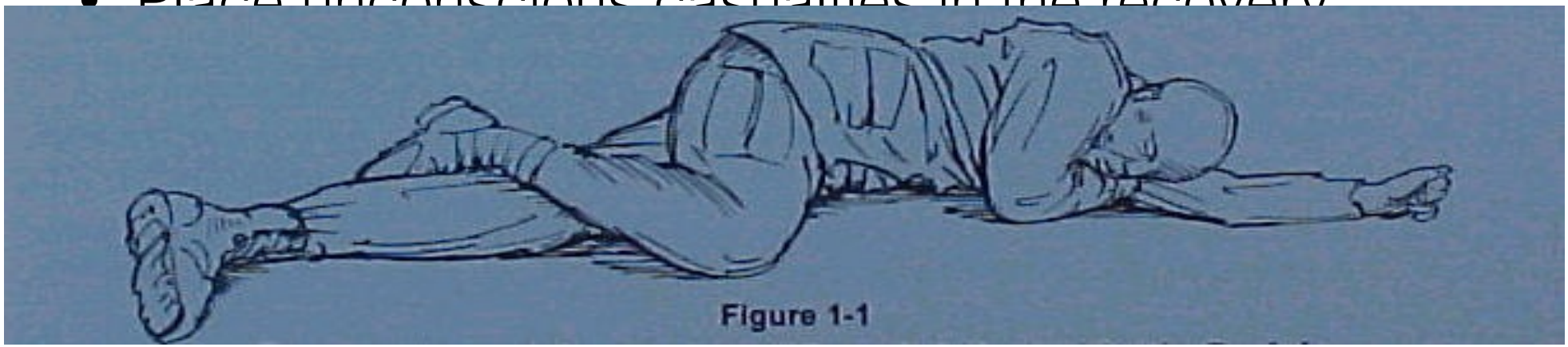
- Positioning (self performed)
  - Conscious casualties will find a way to breath – allow them to do so
  - Decreased state of consciousness or unconscious casualties need your help
- Recovery position if unconscious
  - Maintain casualty on side to allow drainage and gravity to move anatomy to keep airway open
  - Casualties often vomit (blast; morphine)
- Head tilt-Chin lift
- NPA - (Nose-Hose)

Airway problems

- Airway obstructions occurs in three categories of combat related patients:
  - Facial and neck trauma
  - Unconscious patients
  - Inhalation Burns

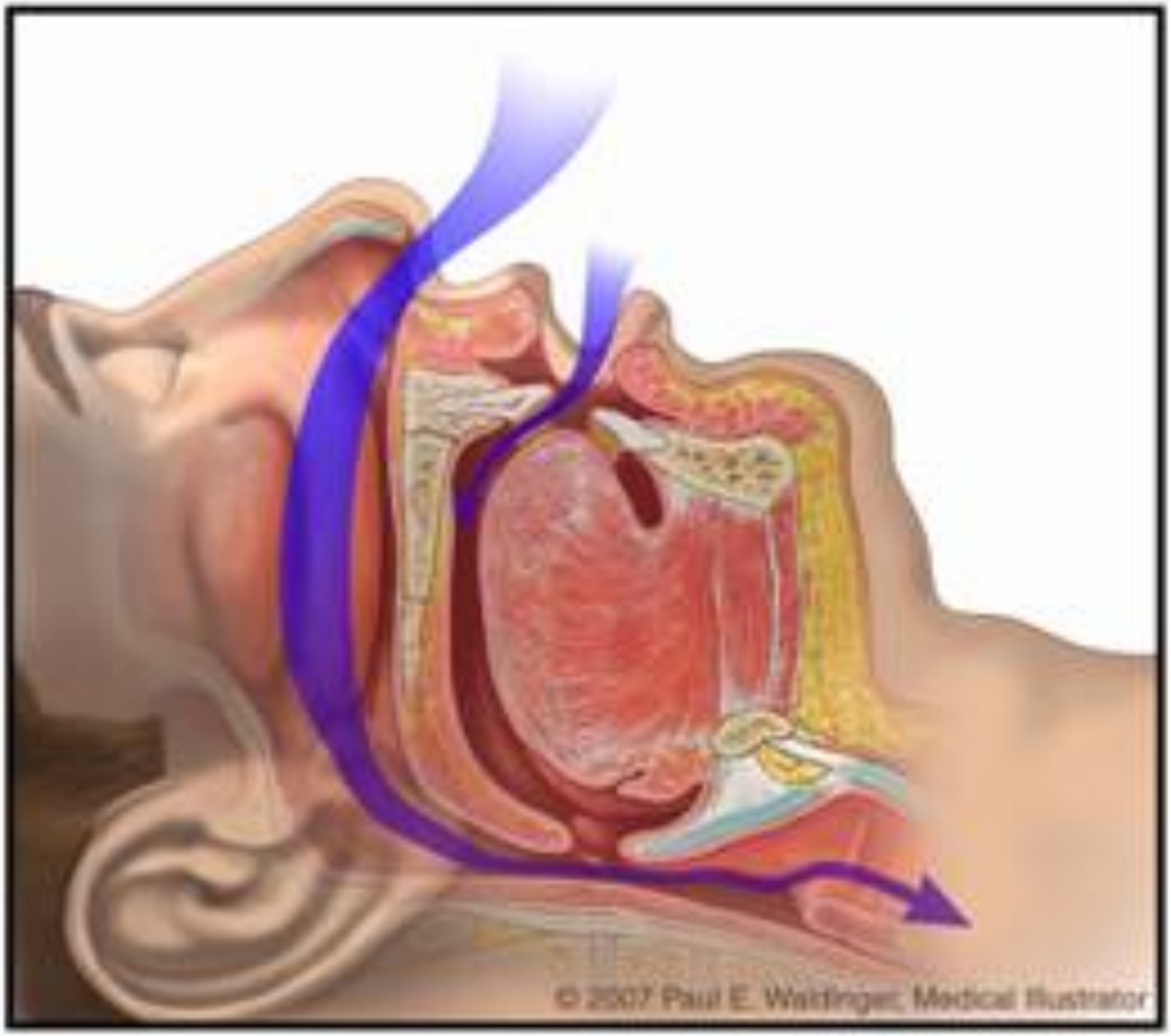
Airway Management

- Place unconscious casualties in the recovery



Nasopharyngeal Airway (NPA)
Nose-Hose

- Open the airway with a head tilt- chin lift maneuver, if unconscious insert a nasopharyngeal airway. Any airway device must be at least 6mm in diameter to allow spontaneous respiration.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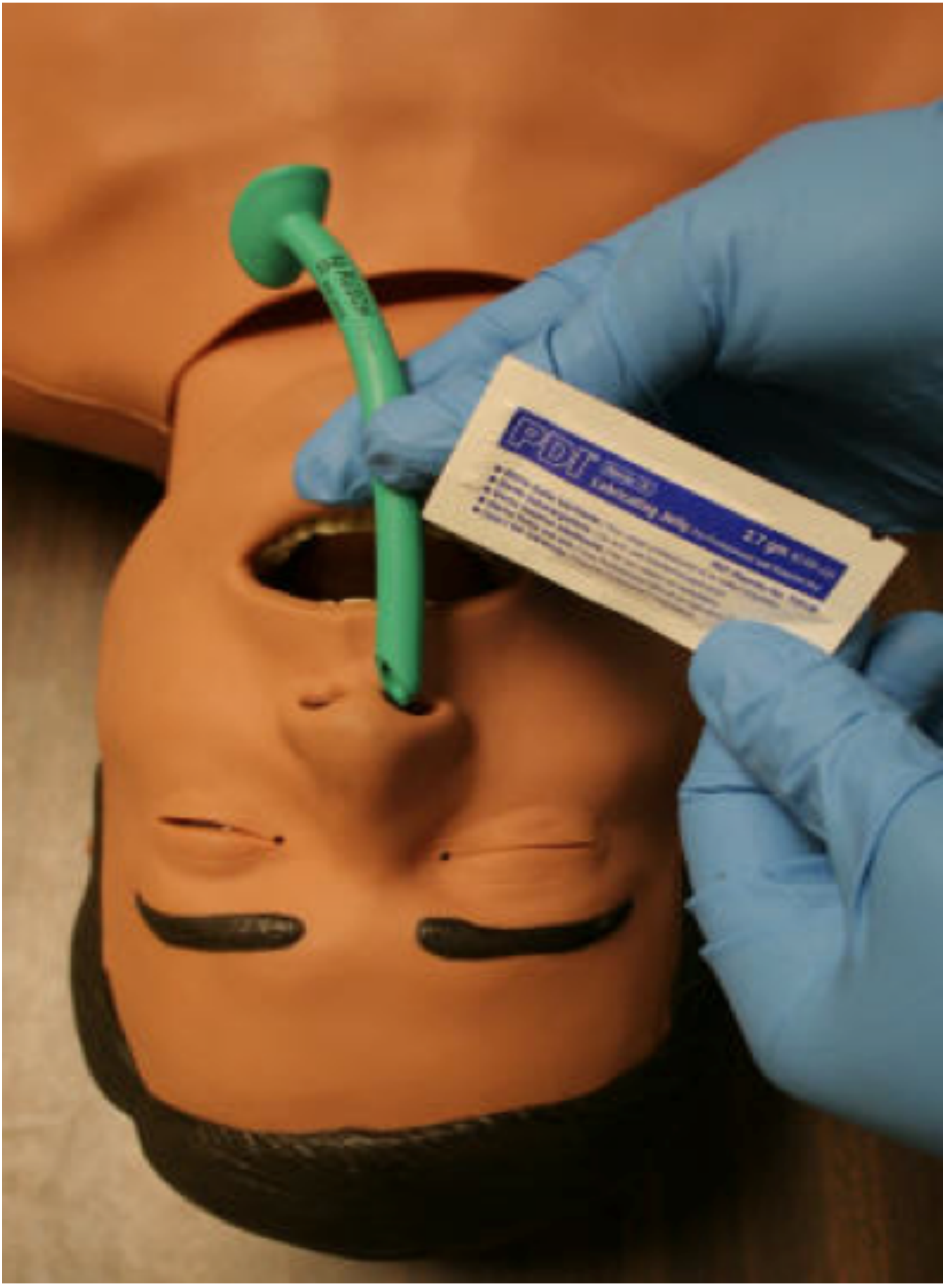
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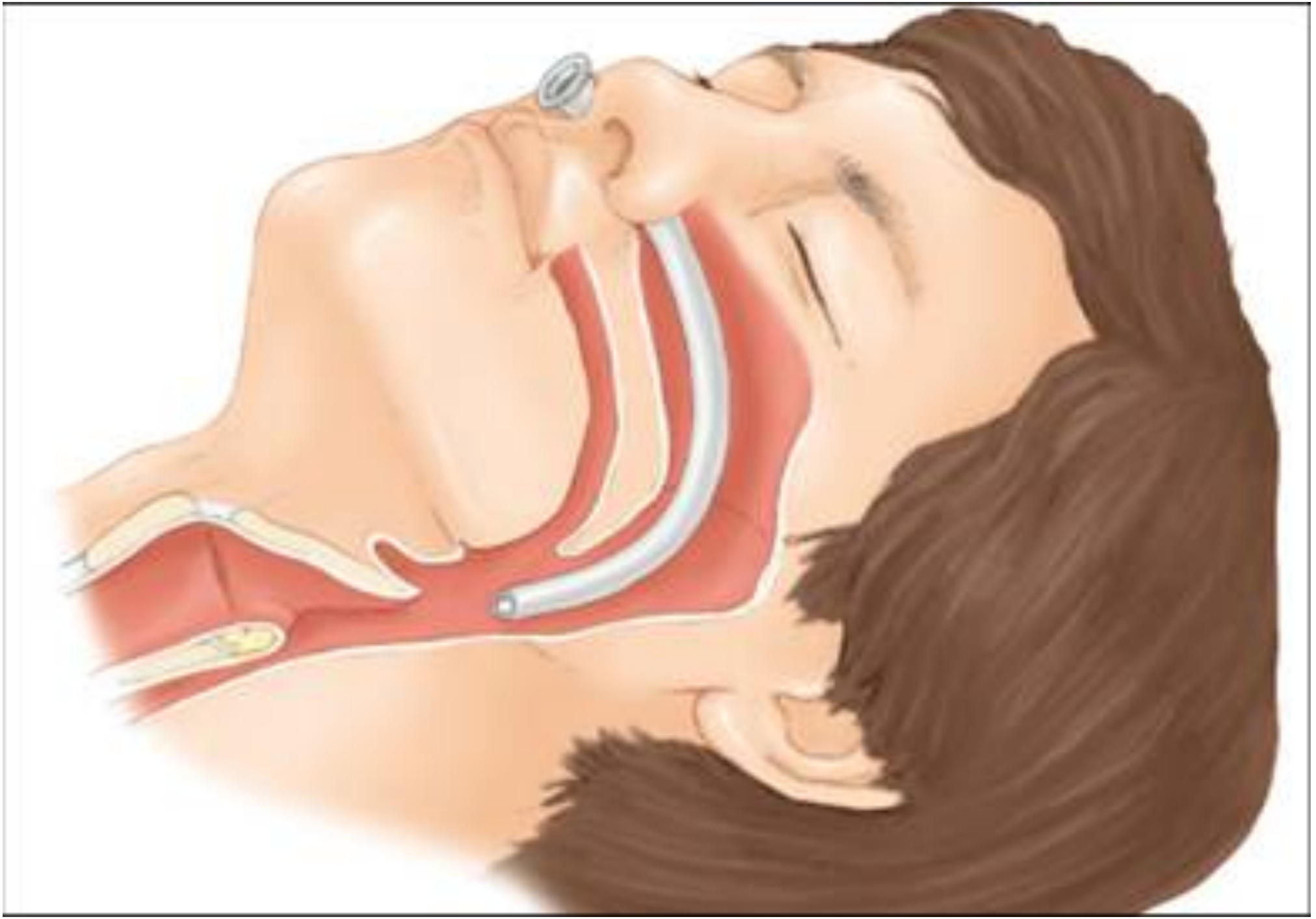


Evacuation Principles for Airway Casualties

- Casualties with penetrating facial trauma bleed profusely and can die from either blood loss or aspiration of blood (drowning)

- Unconscious litter patients with facial injuries should NOT be transported on their backs unless a medical provider has established an advanced definitive airway

Evacuation Principles for Airway Casualties

- Transport casualties with massive facial wounds either on their sides or on their stomachs with their heads turned to the side
- This allows fluids (blood/vomit) to drain out of the mouth and keeps the tongue from falling back
- Casualties that have a decreased level of consciousness should be evacuated with an NPA
- Casualties with compromised airways are urgent

Airway Summary

- Use least invasive technique first
- Positioning alone may be all you need
- Remember to protect casualties airway during evacuation and constantly monitor
- Airway injuries always require positional airway and may require advanced medical airways
- Airway treatments are not done in danger areas (Care Under Fire)

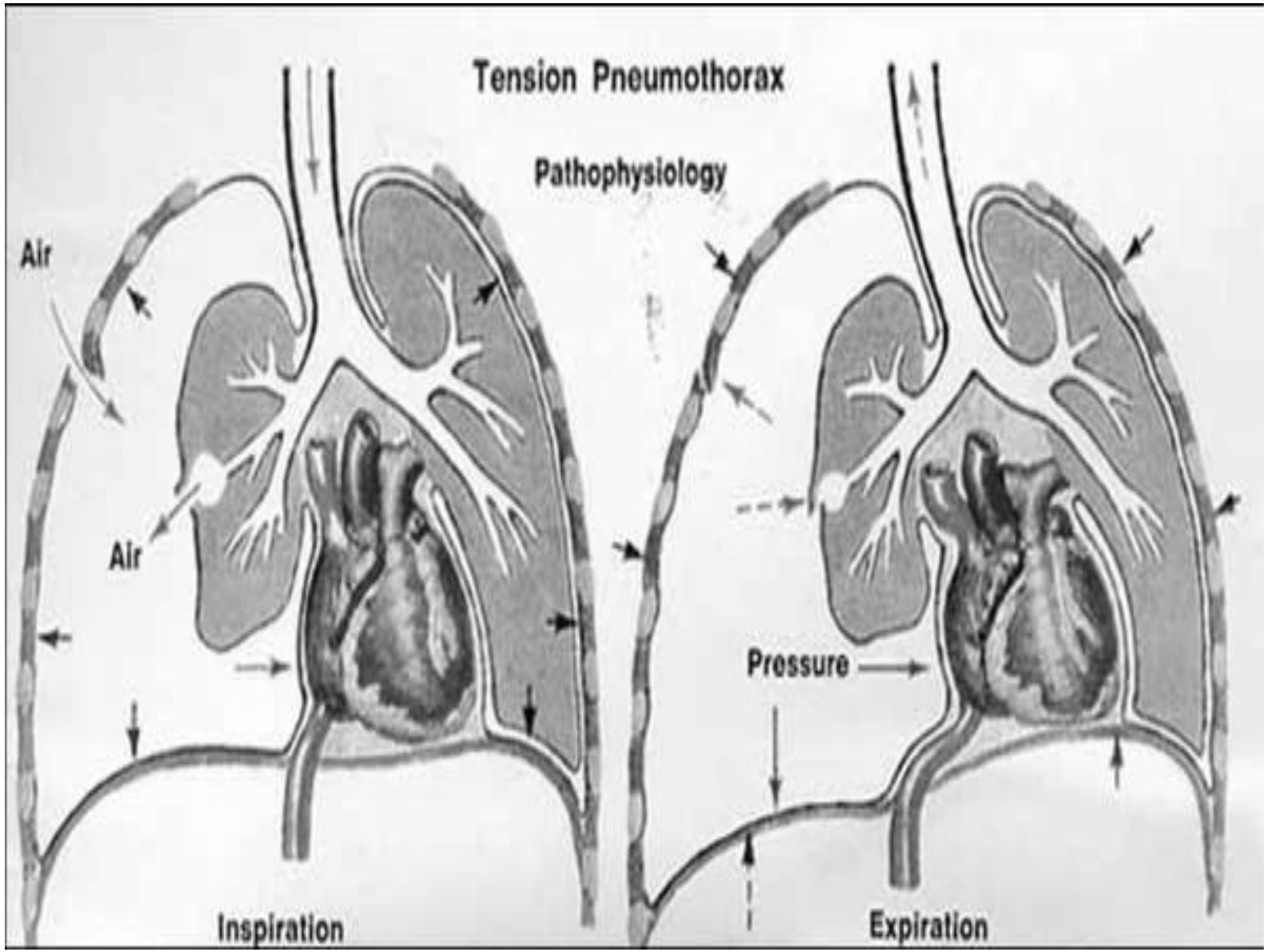
BREATHING

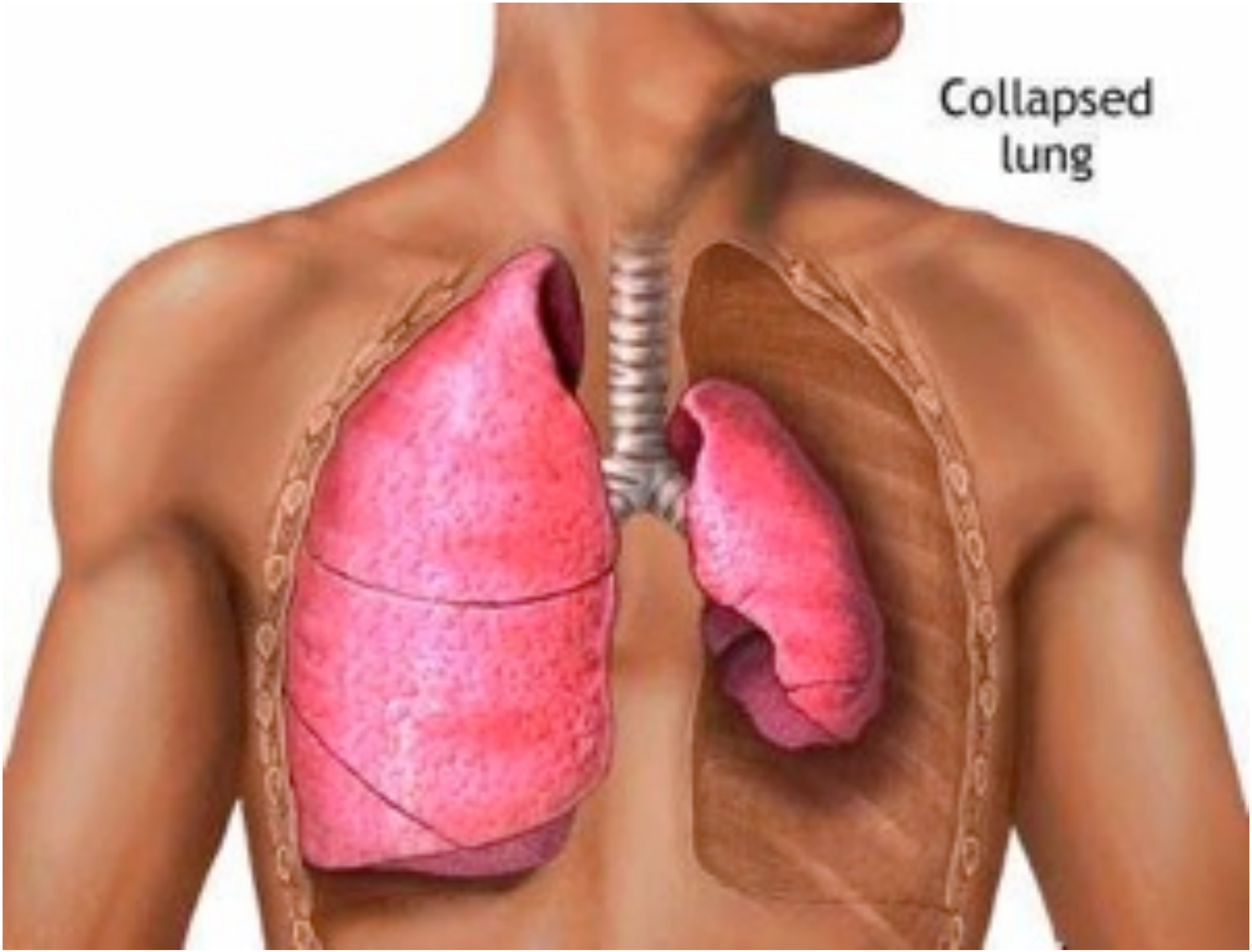
- All holes in the chest – defined as between the neck and navel - should be closed with an occlusive dressing (tape on 4 sides)
- Chest normally has a negative intra-thoracic pressure
- After perforation of the chest wall, the pressure becomes positive and causes the lung to collapse

Chest Physiology

- If hole is larger than 2cm (.7 in) then air may enter and exit through that hole instead of through the trachea (sucking chest wound). This will rob air from the remaining good lung and compound the hypoxia already present.
- Sealing the hole must be the first priority

Tension Pneumothroax




Collapsed
lung

Tension Pneumothorax

- Signs and symptoms of tension:
  - Difficulty breathing
  - No breath sounds on affected side
  - Hyperresonate to percussion (sounds like drum)
  - Hypotensive (low blood pressure)
  - Jugular (neck) vein distention (enlargement)
  - Tracheal shift

Tension Pneumothorax

- Why is tension pneumothorax rapidly fatal??
  - Pressure in chest pushes heart and large vessels against good lung causing collapse
  - Great vessels are crimped and blood flow to and from heart is compromised
  - Heart is unable to provide adequate circulation

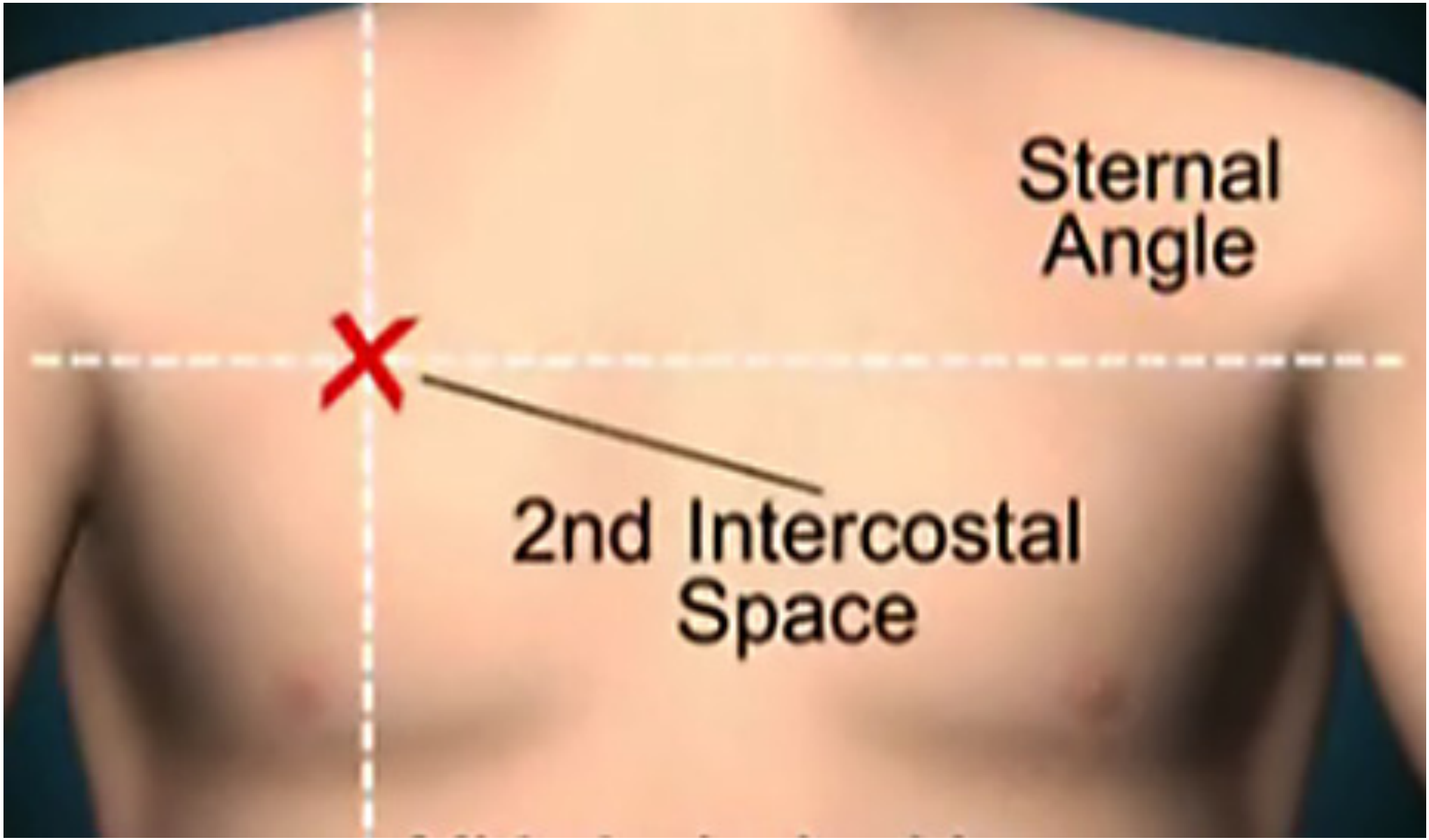
Chest Seal problems

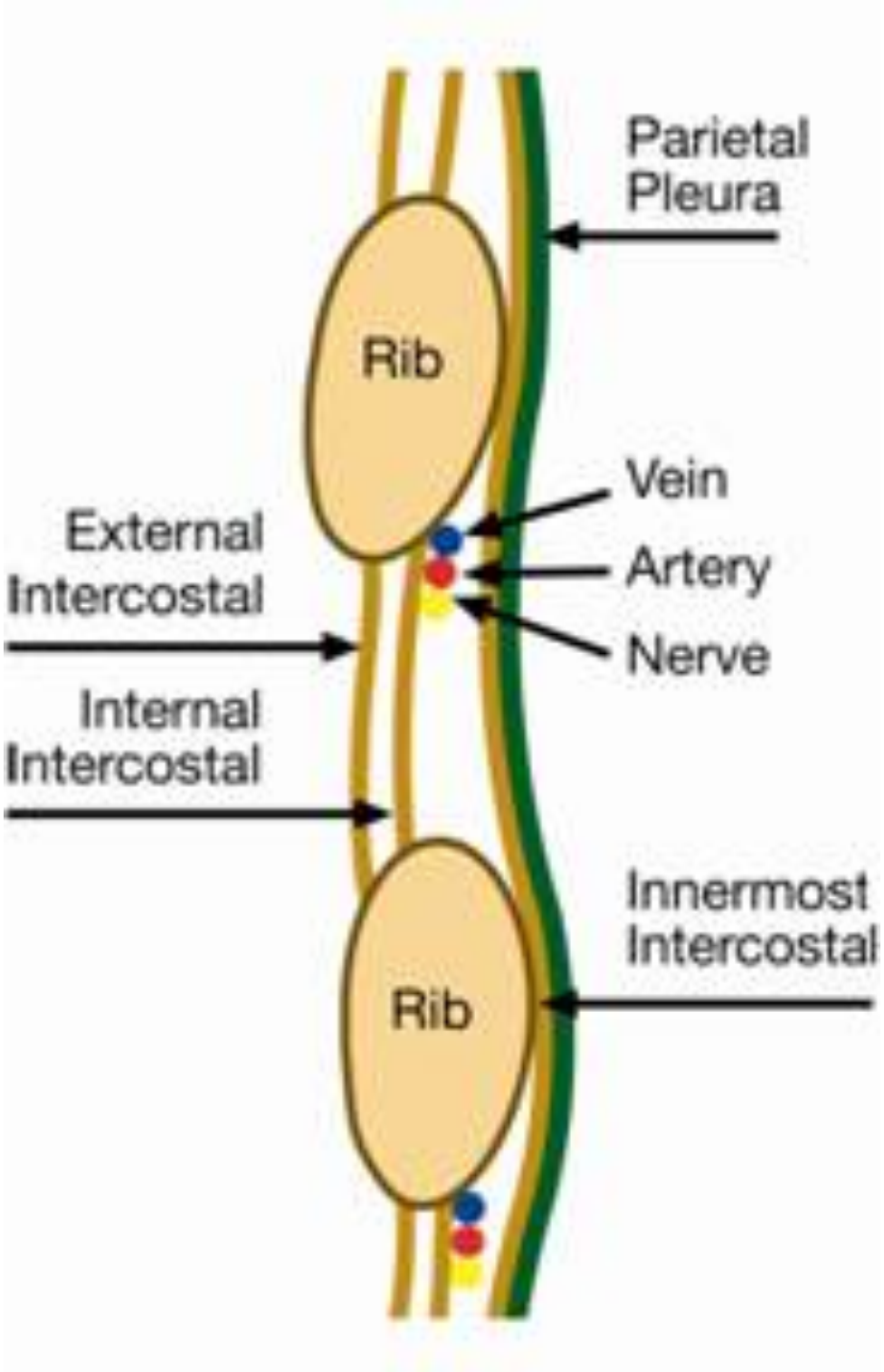
Breathing Principle

- Progressive respiratory distress secondary to a penetrating chest wound should be considered a tension Pneumothorax
- A suspected tension Pneumothroax should be decompressed with a 14 gauge 3.25 in. needle/ catheter
- Tension Pneumothorax is one of the preventable causes of death on the battlefield

Needle / Chest Decompression (NCD)

- 2nd intercostal space mid-clavicular line

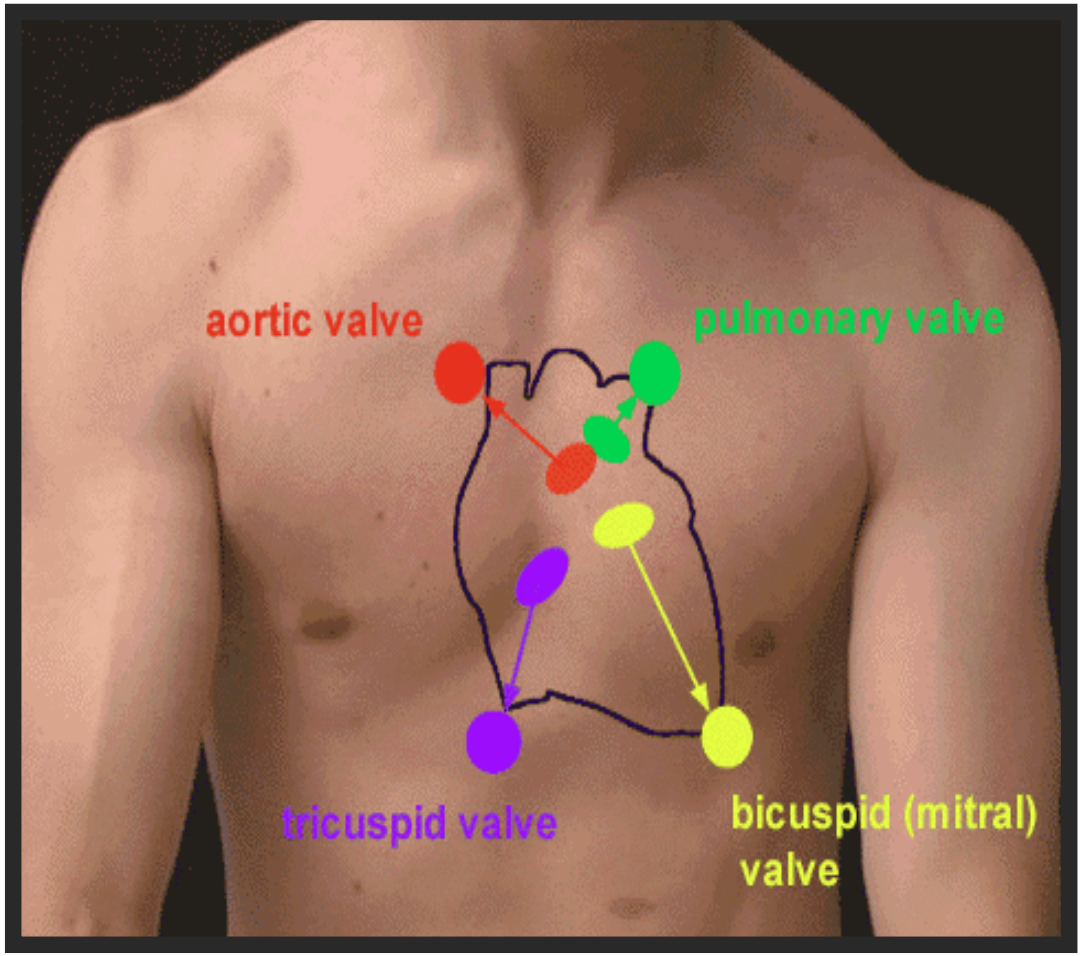

Sternal
Angle
2nd Intercostal
Space


Parietal
Pleura
Rib
Vein
Artery
Nerve
External
Intercostal
Internal
Intercostal
Innermost
Intercostal
Rib

Needle / Chest Decompression Steps

- Identify second intercostal space (ICS) along the mid-clavicular line (MCL)
- Over the top of the third rib insert a 14 ga 3.25 in needle/ catheter unit at a 90 degree angle to the chest wall.
- Insert needle all the way to the hub. Listen for a hiss of escaping air. This indicates you have entered the chest cavity.

Needle / Chest Decompression



Needle Decompression

- Remove needle and tape catheter in place
  - If possible allow the casualty to sit up

- In animal studies this technique was effective for up to four hours

Needle Decompression Frequently Asked Question

- What if casualty doesn't have a tension pneumothorax and you perform Needle Decompression?
  - Already has hole in chest that is probably larger than diameter of 14 ga needle
  - No additional damage

Needle Decompression
Frequently Asked Question

- Can needle decompression be repeated if the patients respiratory distress returns?
  - Yes, repeat as needed

Needle Decompression Frequently Asked Question

- Does the needle/catheter need a glove finger or three-way-stopcock to prevent air from re-entering the chest cavity?
  - No, the diameter of the 14 ga. Catheter is too small to allow air to re-enter the chest.

Needle Decompression Frequently Asked Question

- Will lung re-inflate after pressure is released from chest cavity?
  - No - To re-inflate lung you must have a chest tube with suction and or positive pressure ventilation
  - We are converting a tension pneumothorax to a standard pneumothorax.
  - This is a much more survivable injury than a tension pneumothorax

Needle Decompression Frequently Asked Question

- If you do not have the ability to perform needle decompression, how would you treat a casualty who develops a tension pneumothorax?
  - Remove part of the bandage and attempt to burp the wound
  - If that is not effective, put on a glove and stick your finger into the wound

Evacuation Principle

- Casualties with breathing difficulty must be carefully positioned and often feel the need to move to breath
- If the casualty is conscious try and sit them up partially - Place a rucksack or blankets behind them
- If the casualty is unconscious place them injured side down to allow the good lung to ventilate easier

Evacuation Principle

- Once a person develops a tension they will probably develop another in a matter of time so they require constant monitoring
- If you left a catheter in place and the casualty re-develops respiratory distress the catheter may have become clogged or dislodged
- If a patient shows signs of progressive respiratory distress AFTER 1st needle they get another needle
- A casualty with a tension is urgent

Breathing Principles - Summary

- Cover all holes between neck and navel
- Constantly monitor for signs of respiratory distress
- Progressive / worsening respiratory distress and a penetrating injury to the chest are the indications for a needle decompression – even if you have given one already
- Attempt to burp wound if there is no needle
- Transport in best possible position or injured side down

Other Injuries

Abdominal Treatment

- Protect the contents
- Attempt to gently replace (medic) or cover and keep moist (all)
- Dessication (drying of bowel) leads to removal of bowel
- Bleeding into the abdomen can be from multiple locations and is non-compressible
- Relative Evacuation Priority for someone who is bleeding into belly?

Fractures
Open or Closed

- Open Fracture – associated with an overlying skin wound
- Closed Fracture – no overlying skin wound

Open fracture

Closed fracture

Splinting Objectives

- Prevent further injury
- Protect arteries and nerves
  1. Check pulse before and after splinting
- Make casualty more comfortable

Principles of Splinting

Rule of Two's

- Two Pulses
- Two Joints (immobilize)
  - One above the injury
  - One below the injury
- Two Ties
  - One tie above the fracture
  - One tie below the fracture
  - One tie above the joint
  - One tie below the joint

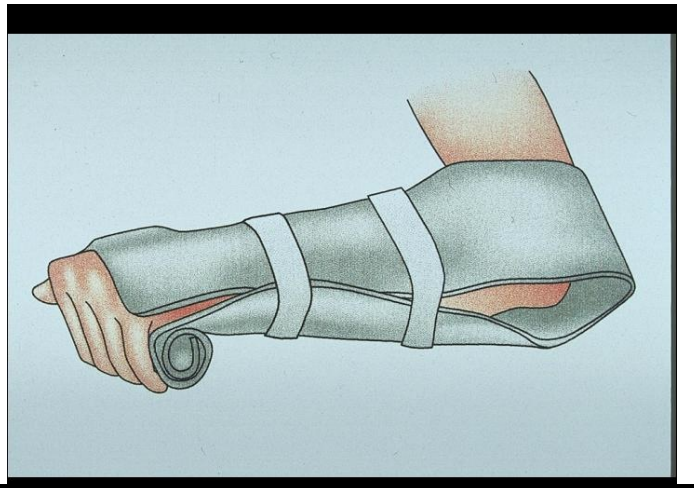
Things to Avoid in Splinting

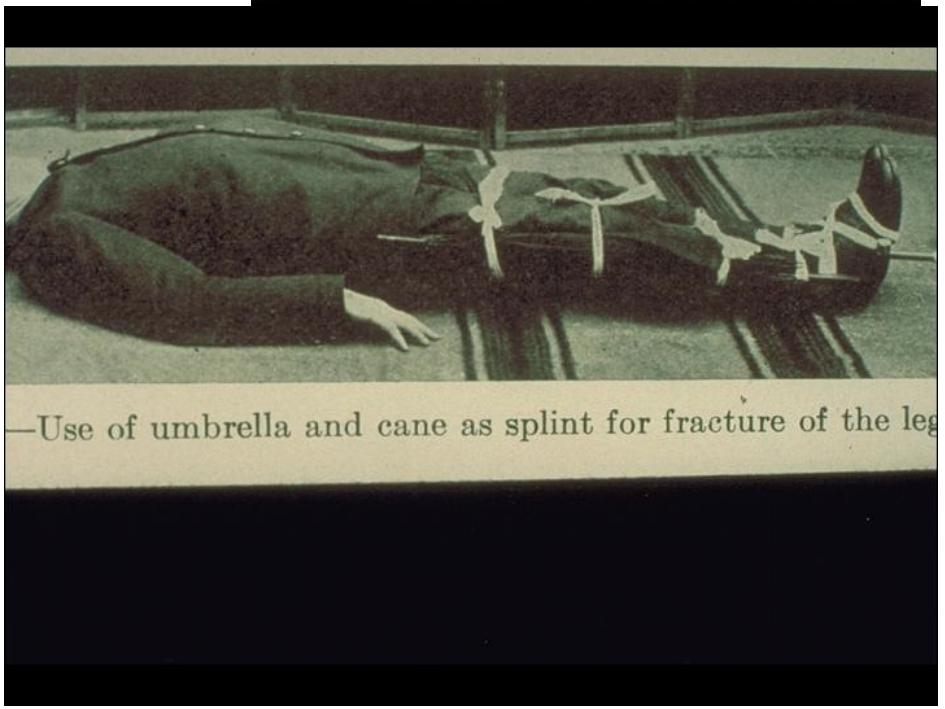
- Manipulating the fracture too much and damaging blood vessels or nerves

- Wrapping the splint too tight and cutting off circulation below the splint

Splinting Materials

- Commercial
- Field expedient
- Other leg





Evacuation

- 1 person drag – with/without line
- 2 person drag – with/without line
- SEAL team three carry
- Hawes Carry

One Person Drag

One Person Drag

- Advantage
  - No equipment required
  - Only one rescuer exposed to fire
- Disadvantage
  - Relatively slow
  - Not optimal position for dragging

Two Person Drag

Two Person Drag

- Advantage
  - Faster
- Disadvantage
  - Exposes 2 rescuers to fire

Two Person Drag with Lines

2 Person Drag with Lines

- Advantages
  - Faster than dragging without line
  - “able to shoot”
- Disadvantages
  - Exposes 2 rescuers to fire

Seal Team Three Carry

Seal Team Three Carry

Seal Team Three Carry

- Advantages
  - Less painful for patient
  - May be useful where drags do not work
- Disadvantages
  - Difficult in unconscious patients
  - Slower
  - Difficult with other equipment

Hawes Carry

Hawes Carry

- Technique
  - Rescuer squats; casualty's arms around rescuer's neck; rescuer lifts with legs

- Advantages
  - One rescuerMay be useful in situations where a drag is not a good option
  - Works much better than outdated fireman's carry

Hawes Carry

- Disadvantages
  - Hard to accomplish with rescuer and/or casualty's kit in place
  - Difficult when rescuer is small and casualty is large
  - Often slower than dragging
  - High profile for both rescuer and casualty

How NOT to do it

Practical Experience

- 2 part training evolution
  - Individual stations (15 minutes each)
    - CAT1 tourniquet
    - NPA/dressings
    - Patient carries
  - Scenario based experience (large group, 15 min)