BLAST RELATED INJURIES

OVERVIEW

- Five Categories of Blast Effects
- Pattern of Injuries
- Wounding Effects of Fragmentation
- Wounding Effects of Overpressure

LEARNING OBJECTIVES

Please Read Your

Terminal Learning Objectives

And

Enabling Learning Objectives

FIVE CATEGORIES OF BLAST EFFECTS

- Primary
- Secondary
- Tertiary
- Quaternary
- Quinary

FIVE CATEGORIES OF BLAST EFFECTS

- Primary
  - Impact = Pressure
  - MOI = Overpressure
  - Injuries = Hollow organs (Lungs and TM)

FIVE CATEGORIES OF BLAST EFFECTS

- Secondary
  - Impact = Projectiles
  - MOI = Debris from blast
  - Injuries = Penetrating trauma

FIVE CATEGORIES OF BLAST EFFECTS

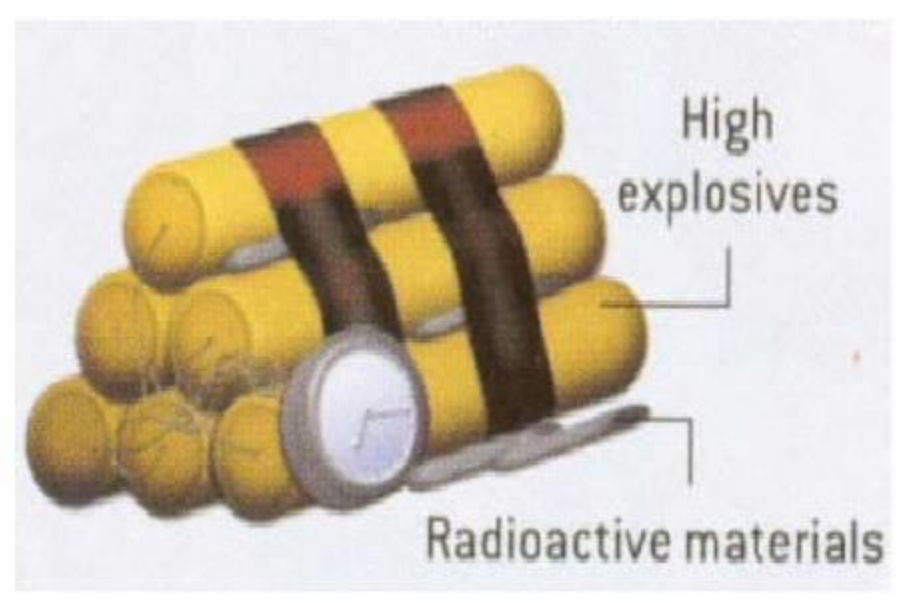
- Tertiary
  - Impact = Body vs. hard surface
  - MOI = Structural collapse
  - Injuries = Blunt trauma, crush injuries

FIVE CATEGORIES OF BLAST EFFECTS

- Quaternary Impact
  - Impact = Heat/flames
  - MOI = Burns and toxic injuries
  - Injuries = Burns, asphyxiation

FIVE CATEGORIES OF BLAST EFFECTS

- Quinary
  - Impact = Additives i.e. radiation (dirty bomb)
  - MOI = Contamination
  - Injuries = Varies



PATTERN OF INJURIES

- Military
  - Young and healthy
  - Protective gear
- Civilian
  - Very young or old
  - Poor health
  - Little protective gear

EFFECTS OF FRAGMENTATION

- Fragments from:
  - Bomb
  - Environment
  - Human Body

EFFECTS OF FRAGMENTATION

- Limbs
  - Most commonly affected
- Eyes
  - Susceptible to secondary and tertiary effects

EFFECTS OF OVERPRESSURE

- Physics of Blast Waves
  - Stress Waves – Injures gas-filled organs (lungs, ears, intestines)
  - Sheer Waves – Cause tissue to move back and forth

EFFECTS OF OVERPRESSURE

- Lung Injuries (injuries at 40 psi)
  - Most common cause of death associated with the primary blast effect
  - Signs and Symptoms
    - Onset may be immediate or delayed up to 48 hrs
    - Internal hemorrhage
    - Frothy, bloody secretions
    - Hypoxic

EFFECTS OF OVERPRESSURE

- Lung Injury Treatment
  - Difficult in a tactical setting
  - Monitor for dyspnea and frothy sputum
  - Provide oxygen as soon as it is available
  - Limit IV solutions
  - TACEVAC ASAP

EFFECTS OF OVERPRESSURE

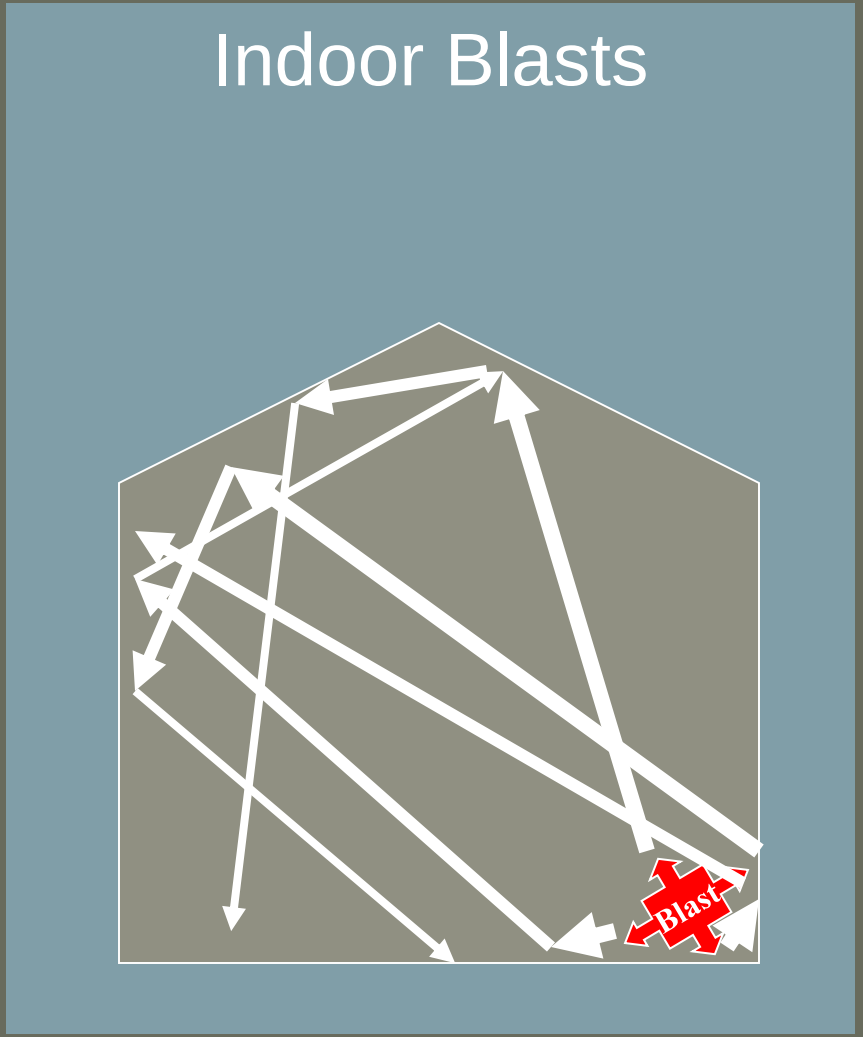
- Ear Injuries (Injuries at 5-15 psi)
  - Absence of tympanic membrane rupture can help rule out other blast injuries
  - Signs and Symptoms
    - Loss of hearing
    - Bleeding from ears
    - Visualization of the ear drum

EFFECTS OF OVERPRESSURE

- Treatment of tympanic membrane rupture
  - Most will heal on their own
  - Avoid probing or irrigating
  - Refer to Medical Officer within 24 hrs

EFFECTS OF OVERPRESSURE

- Gastrointestinal
  - Higher probability with detonations inside a building
- Solid Organs
  - Very rare in open air blasts
  - Reported in underwater blasts



EFFECTS OF OVERPRESSURE

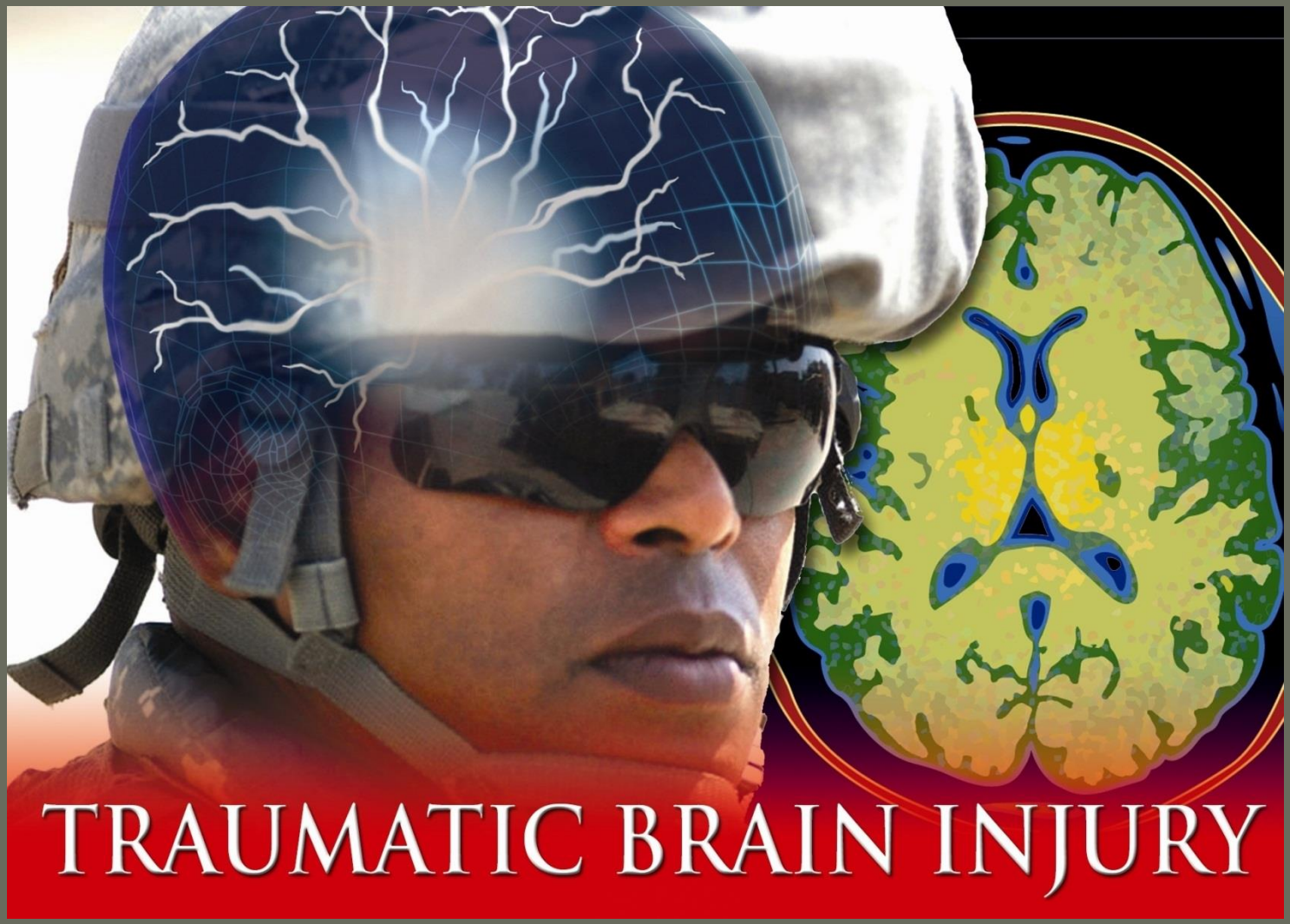
- CNS/Traumatic Brain Injury
  - Common with blast injuries
  - Mild TBI may go undiagnosed, therefore ALL PERSONNEL involved in a blast incident should be referred to a medical officer for documentation and evaluation

MULTIPLE ETIOLOGY INJURIES

- Explosions create different injury patterns based on various factors.
- The patient may have multiple injuries
  - Performing a systematic casualty assessment will identify and allow you to treat life-threatening injuries first.

BLAST RELATED INJURIES

EVALUATE TRAUMATIC BRAIN INJURY



OVERVIEW

- Mandatory Events Requiring TBI Evaluation
- Signs & Symptoms
- Components of MACE Exam
- Required data for the SIGACT Report

LEARNING OBJECTIVES

Please Read Your

Terminal Learning Objectives

And

Enabling Learning Objectives

Mandatory Events Requiring TBI Evaluation

Mandatory Events Requiring TBI Evaluation

- Potentially Concussive Events
  - Vehicle blast, collision or rollover
  - Presence within 50 meters of a blast
  - A direct blow to the head
  - Exposure to more than one blast event

Signs & Symptoms

Signs & Symptoms

- TBI Can be Divided into 2 Categories
  - Primary Brain Injury
  - Secondary Brain Injury

Signs & Symptoms

- Primary Brain Injury

  – Direct trauma to the brain & associated structures

    - Contusions
    - Hemorrhages
    - Lacerations

Signs & Symptoms

- Secondary Brain Injury
  - The ongoing injury processes from primary injury
  - Management of TBI is focused to limit or stop these secondary mechanisms
    - ICP
    - Hypoxia
    - Hypotension and inadequate CBF

Signs & Symptoms

- Mild TBI
  - Loss of consciousness brief, usually a few seconds/minutes
    - Loss of consciousness does not have to occur
  - Testing and scans of the brain may appear normal
  - Most common: 75%-85% of all brain injuries are mild
  - 90% of individuals recover within 6-8 weeks

Signs & Symptoms

- Moderate TBI
  - Loss of consciousness lasts from a few minutes to a few hours
  - Confusion lasts from days to weeks
  - Physical, cognitive, and/or behavioral impairments last for months or are permanent
  - EEG/CAT/MRI are positive for brain injury

Signs & Symptoms

- Severe TBI
  - Prolonged unconscious state or coma lasts days, weeks, or months
  - Categories include:
    - Coma
    - Vegetative State
    - Persistent Vegetative State
    - Minimally Responsive State
    - Locked-in Syndrome

Signs & Symptoms

- If “Yes” on I.E.D. Checklist, refer for medical evaluation

Figure. I.E.D. Checklist

Injury	Physical damage to the body or body part of a Service member?	(Yes/No)
Evaluation	**H** – Headaches and/or vomiting?	(Yes/No)
	E – Ear ringing?	(Yes/No)
	A – Amnesia, altered consciousness, and/or loss of consciousness?	(Yes/No)
	D – Double vision and/or dizziness?	(Yes/No)
	S – Something feels wrong or is not right?	(Yes/No)
Distance	Was the Service member within 50 meters of the blast? Record the distance from the blast.	(Yes/No) Not Applicable

Components of MACE Examination

Components of MACE Exam

- Military Acute Concussion Evaluation
  - Tool for small-unit commanders and medical personnel
  - Assesses cognitive function following incidents

Components of MACE Exam

- Description of Incident
  - What happened?
  - Tell me what you remember.
  - Were you dazed, confused, “saw stars”?
  - Did you hit your head?

Components of MACE Exam

- Cause of Injury
  - Explosion/blast
  - Blunt object
  - Motor vehicle crash
  - Fragment
  - Fall
  - Gunshot wound
  - Other

Components of MACE Exam

- Was a Helmet Worn?
- Amnesia Before
  - Any events before that are not remembered?
- Amnesia After
  - Any events after that are not remembered?
- Loss of Consciousness?
  - Reported or Observed

Components of MACE Exam

- Symptoms
  - Headache
  - Dizziness
  - Memory Problems
  - Balance Problems
  - Nausea/vomiting
  - Difficulty concentrating
  - Irritability
  - Visual disturbances
  - Ringing in ears
  - Other

Components of MACE Exam

- Orientation
  - Month
  - Date
  - Day of Week
  - Year
  - Time
- Score __/5

Components of MACE Exam

- Immediate Memory (3 attempts, any order)
  - Elbow
  - Apple
  - Carpet
  - Saddle
  - Bubble
- Score __/15

Components of MACE Exam

- Neurological Screening
  - Eyes
    - Pupillary response and tracking
  - Verbal
    - Speech fluency and word finding
  - Motor
    - Pronator drift, gait/coordination
- Record Abnormalities

Components of MACE Exam

- Concentration
  - Reverse digits

4-9-3	6-2-9	0	1
3-8-1-4	3-2-7-9	0	1
6-2-9-7-1	1-5-2-8-5	0	1
7-1-8-4-6-2	5-3-9-1-4-8	0	1

  - Months in reverse order (Dec-Nov-Oct-Sep…)
- Score__/5

Components of MACE Exam

- Delayed Recall
  - Recall 5 words from earlier test (Do NOT reread)
    - Elbow
    - Apple
    - Carpet
    - Saddle
    - Bubble
- Score __/5

Components of MACE Exam

- Total Score __/30

- Diagnosis
  - No Concussion
  - 850.0 Concussion without LOC
  - 850.1 Concussion with LOC
  - Other Diagnoses

Required Data for the SIGACT Report

Required Date for SIGACT Report

- After I.E.D./MACE Assessment, results shall be submitted with Significant Activities Report

- Required for all blast-related events

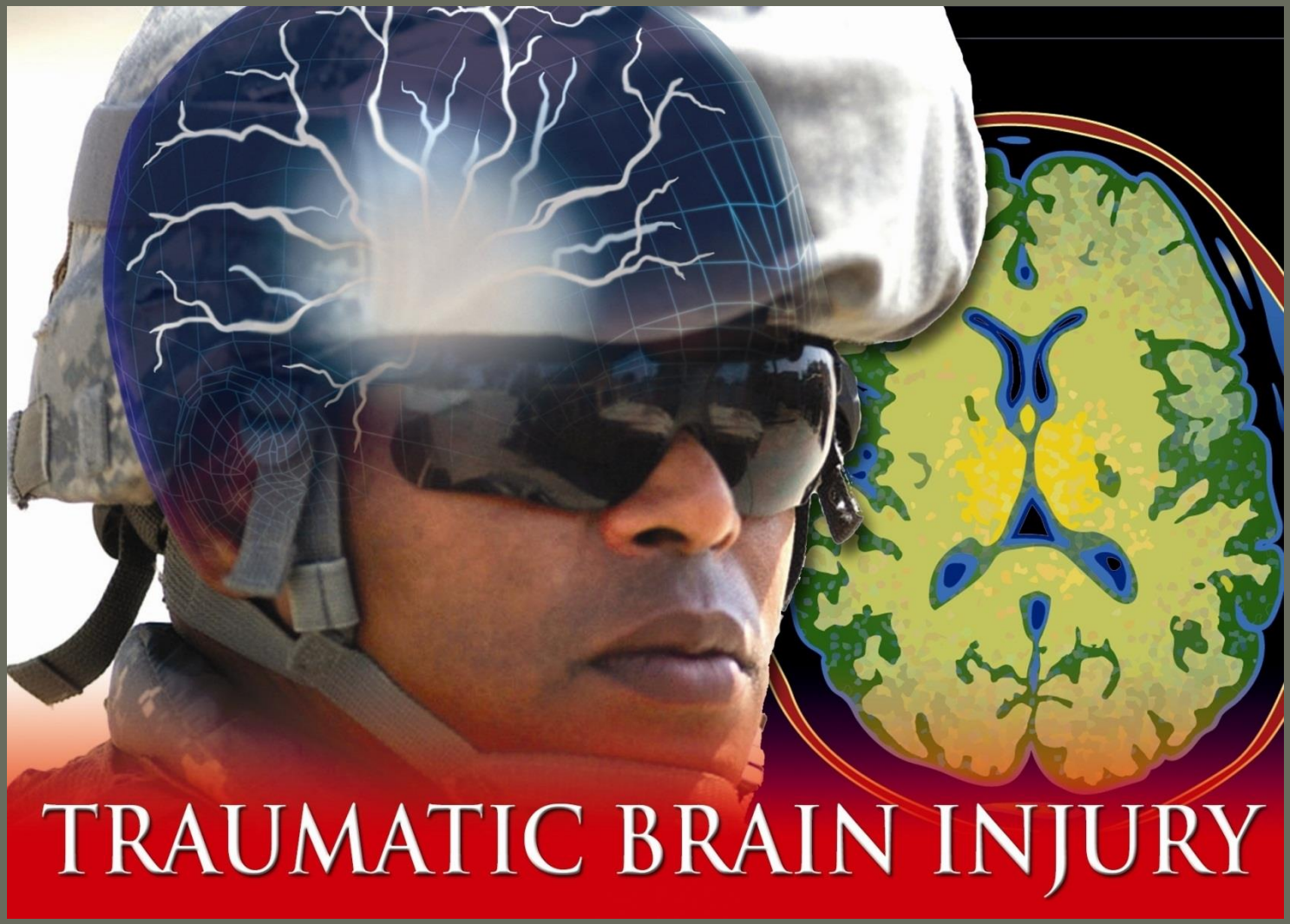
Required Date for SIGACT Report

- Date of Event
- Type of Event
- SIGACT Report Number
- Personal Identifier (DOD ID, ZAP)
- Service Member's Name

Required Date for SIGACT Report

- Unit Name, UIC, and Home Duty Station
- Combatant Command
- Service Member's Distance from Blast
- Medical Disposition

EVALUATE TRAUMATIC BRAIN INJURY



MANAGE BURN CASUALTIES

OVERVIEW

- Anatomy
- Types of Burns
- Degrees of Burns
- Burn Size Estimation
- Treatment for Burns

LEARNING OBJECTIVES

Please Read Your

Terminal Learning Objectives

And

Enabling Learning Objectives

ANATOMY OF THE SKIN

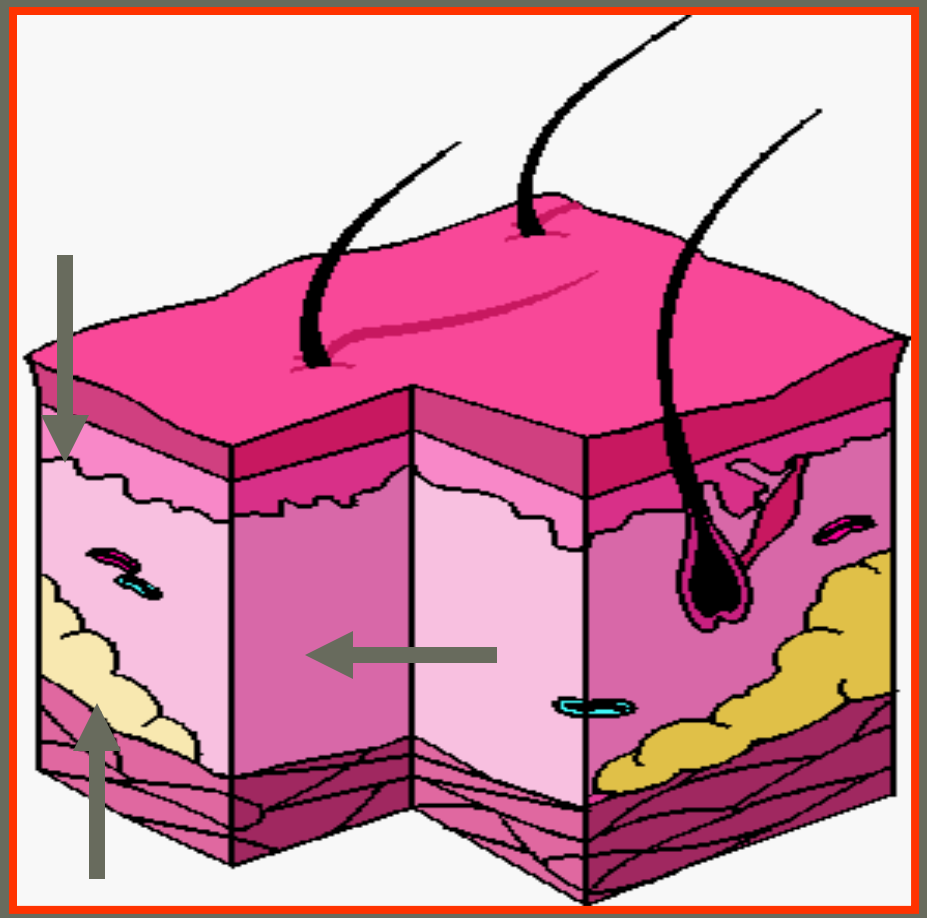
The skin is the protective barrier against the environment:

- Prevents fluid loss
- Helps regulate body temperature
- Prevents infection

ANATOMY OF THE SKIN cont.

Composed of 3 layers

- Epidermis
- Dermis
- Subcutaneous



TYPES OF BURNS

- THERMAL
- ELECTRICAL
- CIRCUMFERENTIAL
- RADIATION
- CHEMICAL

THERMAL BURNS

- Most common type on the battlefield
  - Flame/Incendiary weapons
  - Munitions
  - Blasts
- These weapons burn at very high temperatures

-White Phosphorous(Willie Pete)
-Thermite
-Magnesium
-Napalm

THERMAL BURNS

- Primary effect of these weapons:
  - Expose the body to superheated gases and flames that cause severe burns

THERMAL BURNS

- Strong potential for airway burns
  - Personnel in bunkers, ship compartments, or armored vehicles

THERMAL BURNS

Airway burns may result in rapid life-threatening swelling and obstruction of the upper airway.

TYPES OF BURNS

- THERMAL
- ELECTRICAL
- CIRCUMFERENTIAL
- RADIATION
- CHEMICAL

ELECTRICAL BURNS

- May be more severe than expected
- Small entrance and exit wounds
  - Large area of tissue damage below the surface and along the path of the current

ELECTRICAL BURNS

- Degree of damage is related to:
  - Amount of current
  - Duration of exposure

Contact electrical burns. The knee on the left was energized, and the knee on the right was grounded.

Electrical burn on hand and arm.

ELECTRICAL BURNS

- Large release of chemicals from destroyed muscle.
  - Cardiac arrhythmias
  - Kidney failure

Arm with third degree burn from high-voltage line.

TYPES OF BURNS

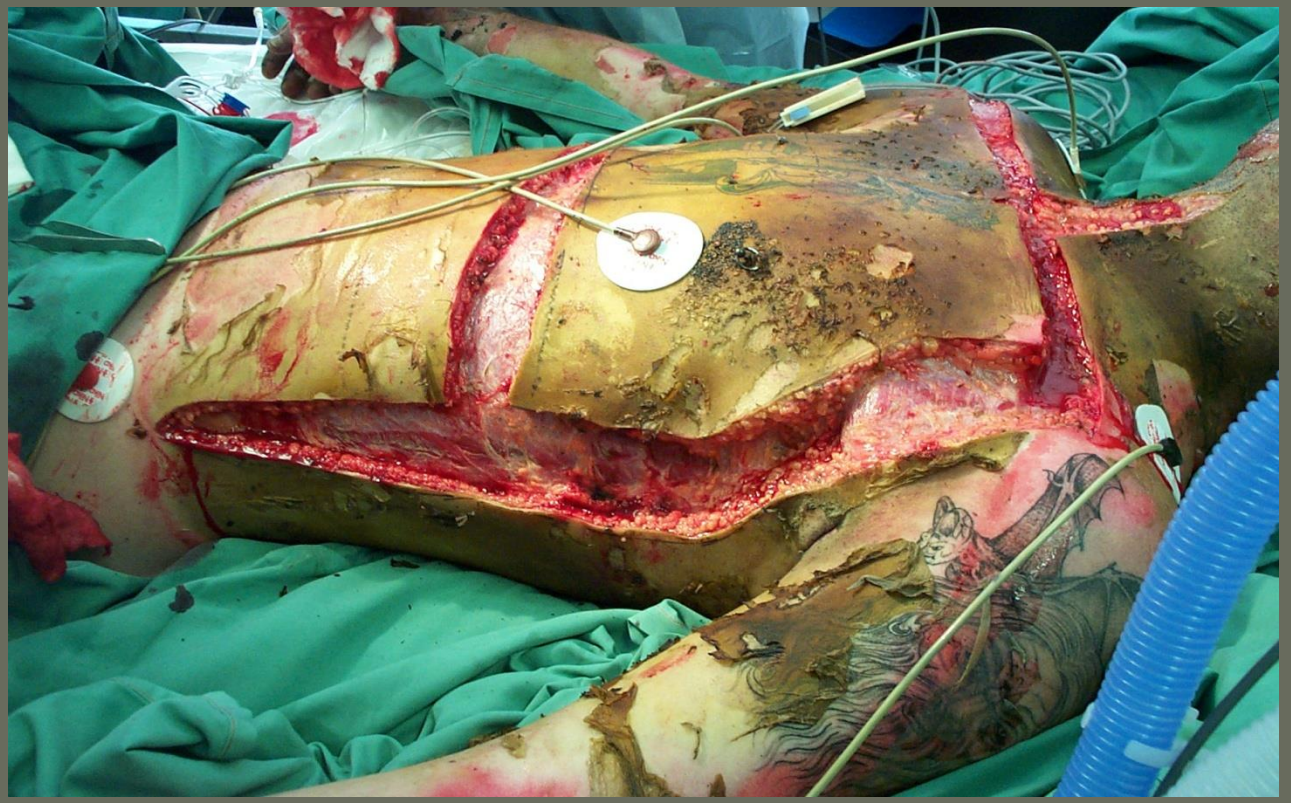
- THERMAL
- ELECTRICAL
- CIRCUMFERENTIAL
- RADIATION
- CHEMICAL

CIRCUMFERENTIAL BURNS

- Burn that encircles the trunk of the body or an extremity.
  - Can produce life or limb threatening condition.
  - Create tourniquet like effect.

CIRCUMFERENTIAL BURNS

- Circumferential chest burns can constrict causing casualty to suffocate.
- Escharotomies are surgical incisions made to allow expansion.



TYPES OF BURNS

- THERMAL
- ELECTRICAL
- CHEMICAL
- RADIATION
- CHEMICAL

RADIATION BURNS

- Associated with nuclear blasts
- Exposed skin is burned by infrared rays emitted at detonation
- Clothing/Shelter offer some protection
- Secondary 1st & 2nd degree burns
- Secondary source burns
- Systematic effects

TYPES OF BURNS

- THERMAL
- ELECTRICAL
- CHEMICAL
- RADIATION
- CHEMICAL

CHEMICAL BURNS

- Occurs when skin contacts a chemical agent
  - Direct chemical destruction of tissue
  - Alkalis, Acids, Organic, Blister

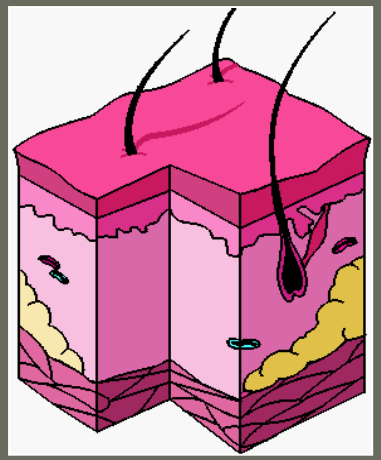
CHEMICAL BURNS

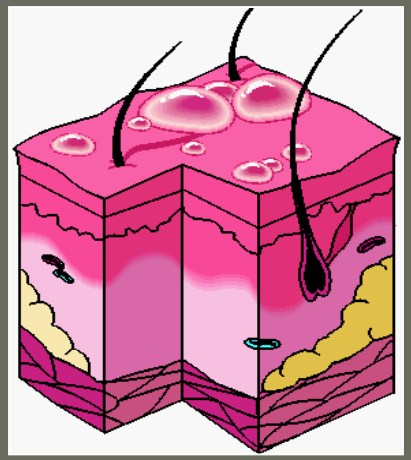
Alkali Burns

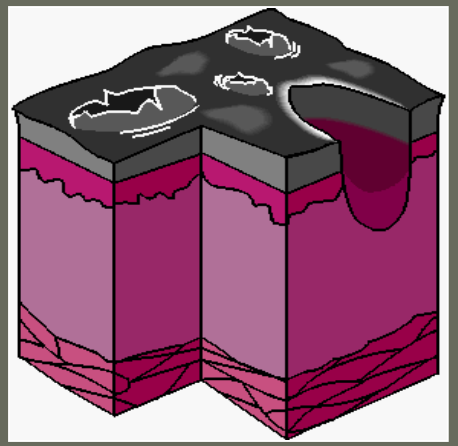
DEGREE OF BURNS

DEPTH OF BURNS

- Burn depth is classified by how deeply the skin is damaged. Often can't determine until 24-48 hours after burn.
  - 1st Degree (Superficial)
  - 2nd Degree (Partial Thickness)
  - 3rd Degree (Full Thickness)
  - 4th Degree (Complete)





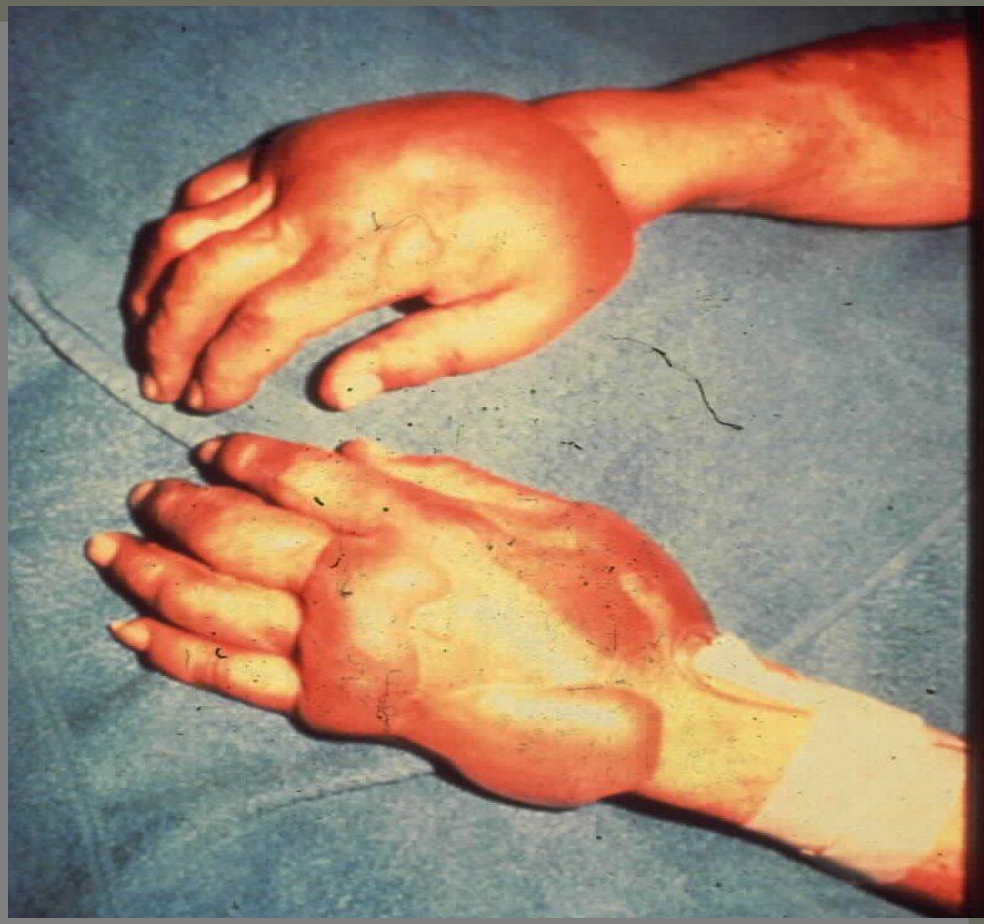


1ST DEGREE (SUPERFICIAL)

- Involves only the epidermis
- Signs and Symptoms
  - Painful to touch
  - Erythematous skin
  - Blanching with pressure
  - Minimal swelling

2ND DEGREE (PARTIAL THICKNESS)

- Epidermis destroyed and dermis damaged
- Signs and Symptoms
  - Deep, intense pain
  - Moist and reddened skin
  - Blisters or open weeping wounds
  - Moderate edema, possible fluid loss

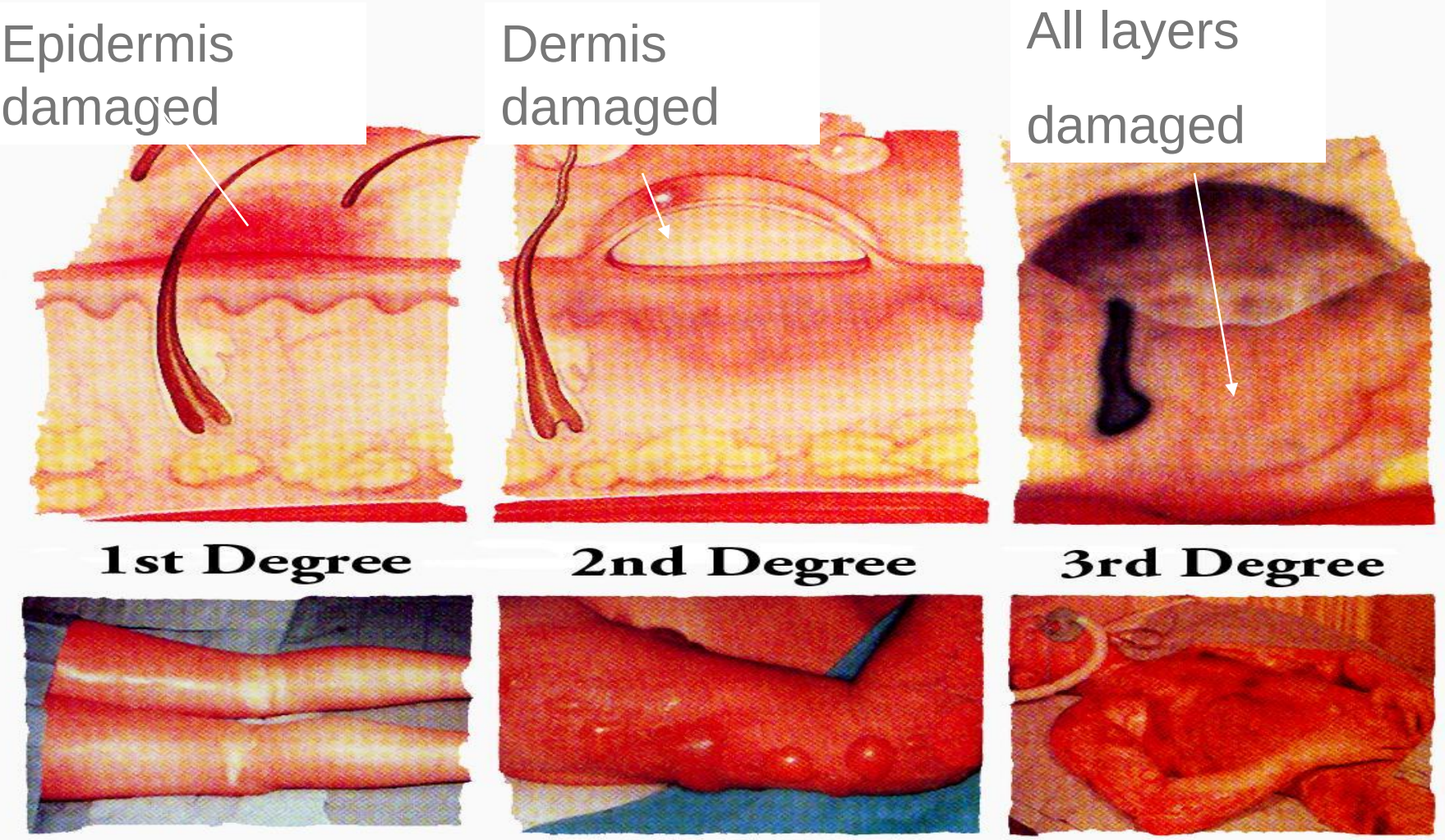


3RD DEGREE (FULL THICKNESS)

- All layers of skin have been damaged
- Signs and Symptoms
  - Pain at periphery, no pain near center
  - Dry, leathery appearance
  - Color range (Pale Yellow, Cherry Red or charred)

3RD DEGREE (FULL THICKNESS)

- Signs and Symptoms (cont.)
  - 1st and 2nd Degree burns around periphery
  - No blanching or capillary refill


Epidermis damaged
Dermis damaged
All layers damaged
1st Degree
2nd Degree
3rd Degree

4th DEGREE BURNS

Burns that penetrate all layers of skin and muscles, fat, bone, and internal organs.

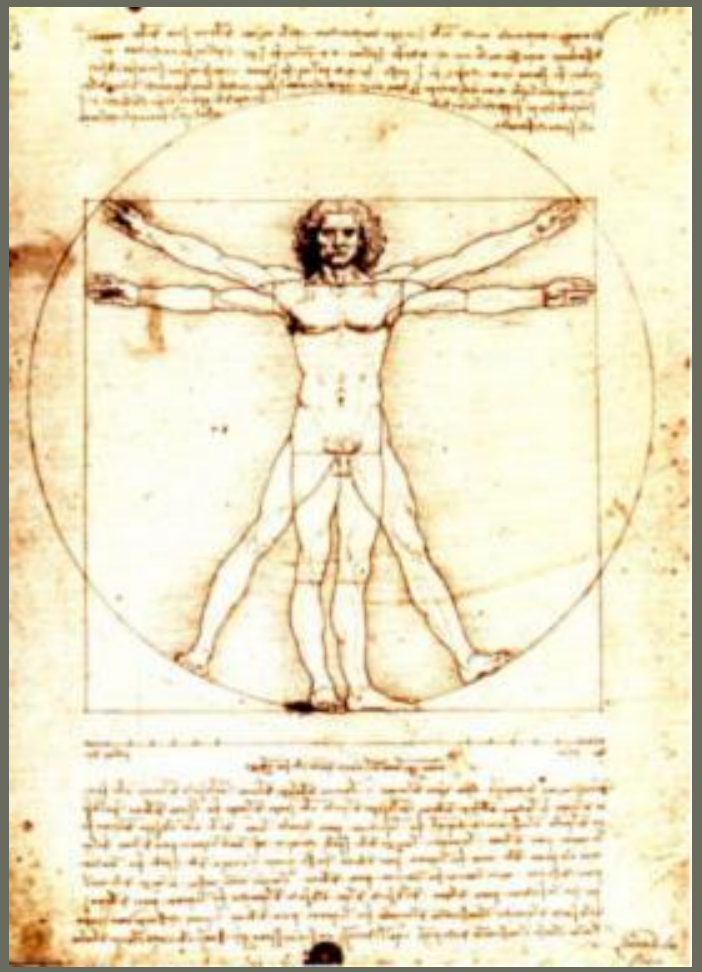
BURN SIZE

BURN SIZE ESTIMATION

- Burns are categorized by the percentage of body surface that is damaged
- Important for calculating fluid replacement needs

BURN SIZE ESTIMATION

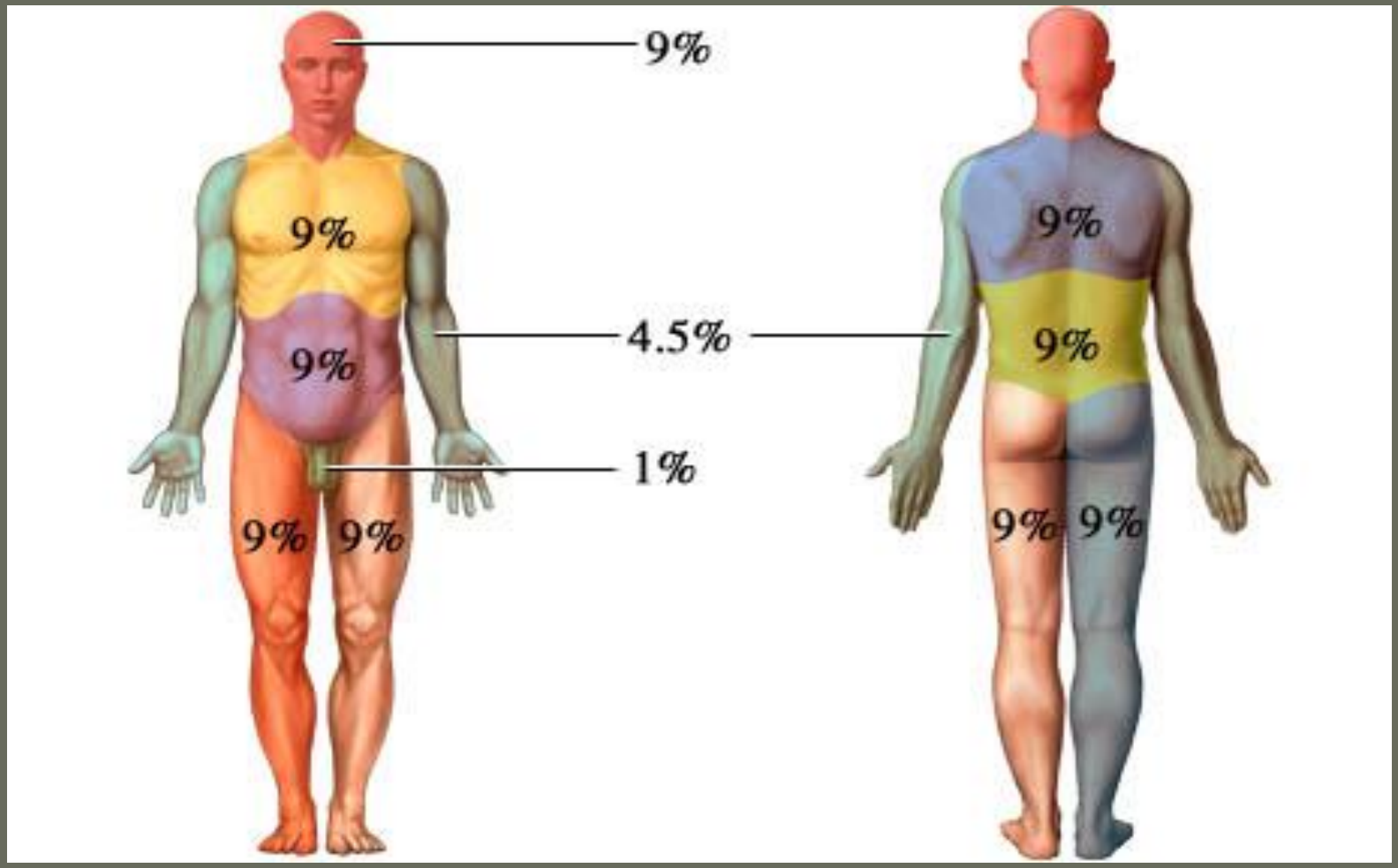
- Two Methods
  - Rule of Nines
  - Rule of Palms



RULE OF NINES

- Divides TBSA into areas of multiples of 9%
- Except the groin which is equal to 1%
- Useful for adults and children over the age of 10

RULE OF NINES



RULE OF PALMS

- Assumes the *PALM* of the patient represents approximately 1% of the TBSA
- The TBSA is estimated by approximating the number of “PALMS” it would take to completely cover the burn
- Useful for small or irregular burns

RULE OF PALMS

- Remember, one hand is approximately 1% of the patient's body surface area

TREATMENT OF BURNS

BURN TREATMENT

- Stop the burning
  - Water is a good method
  - Smother the flames with jacket or blanket
  - Roll the casualty on the ground
- Maintain ABC's
- Perform a Detailed Assessment
  - Skin burns are not immediately fatal, complete assessment for additional injuries and treat them appropriately

BURN TREATMENT

- Prevent Hypothermia

  -Keep PT warm!

- Estimate depth and extent burned
  - Use Rules of Nines or Palms

- Dress the burn


Emergency First Aid for Burns
WATERJEL
STERILE GEL-SOAKED BURN DRESSING
priMED
Crinkle Cotton Fluff
Bandage Rolls
PM5-1245
19 5:22PM
• Relieves Pain
• Cools and Comforts
• Helps Prevent
Contamination
Non-Adherent

Step 1


Emergency First Aid for Burns
WATER-JEL
STERILE GEL-SOAKED BURN DRESSING
• Relieves Pain
• Cools and Comforts
• Helps Prevent Contamination
• Non-Adherent
CONTENTS:
ONE 4" x 16" DRESSING
(10 cm x 40 cm)
19 5:23 PM

Step 2


Emergency First Aid for Burns
WATER-JEL
STERILE GEL-SOAKED BURN DRESSING
• Relieves Pain
• Cools and Comforts
• Helps Prevent Contamination
• Non-Adherent
CONTENTS:
ONE 4" x 16" DRESSING
(10 cm x 40 cm)
19 5:24 PM

Step 3


Emergency First Aid for Burns
WATER-JEL
STERILE GEL-SOAKED BURN DRESSING
• Relieves Pain
• Cools and Comforts
• Helps Prevent Contamination
• Non-Adherent
CONTENTS:
ONE 4" x 16" DRESSING
(10 cm x 40 cm)
19 5:26 PM
Step 4

FLUID RESUSCITATION

FLUID RESUSCITATION

- Hypovolemic shock will result from massive fluid shifts associated with burns.
- The FMST may not be completely responsible for the care of a burned patient, but should be aware of quick attention needed.
- Use “Parkland Formula” to calculate fluid amount.

FLUID RESUSCITATION

– Parkland Formula:

- 4ml LR/NS x Pt's wt in kg x TBSA burned
- 50% given in 1st 8 hrs after burn
- Remaining 50% given over next 16 hours

FLUID RESUSCITATION

- Parkland Formula Example:
- 76 kg casualty sustained partial thickness burn to his anterior chest (9%) and abdomen (9%), entire right arm (9%), and anterior right leg (9%). The injury occurred 30 minutes ago.
- Parkland Formula: 4 ml x 76 kg x 36% = 10,944 ml (or 11 liters of LR)

FLUID RESUSCITATION

- Half of 11 liters should be administered in the first 8 hours after burn:
- In this case the casualty will need 5 ½ liters in the first 8 hours.
- The injury occurred 30 minutes ago.
- The entire 5 ½ liters should be administered over a period of 7 ½ hours

FLUID RESUSCITATION

- The remainder is administered over the following 16 hours
- 5 ½ (5,500 mL) liters divided by 16 = 343 mL per hour for the next 16 hours.

FLUID RESUSCITATION

Rule of 10:

- Simplifies the process.
- Percent BSA burned is rounded to the nearest 10.
  -For example, a burn of 36% would be rounded to 40%.
- The percent burn is then multiplied by 10 to get the number of mL per hour.
- 40 X 10 equaling 400 mL per hour.
- This formula is used for adults weighing 40 to 70 kg. For each 10kg in body weight over 70kg, an additional 100 mL per hour is given.

BURN TREATMENT

- Assess and treat burns to the eyes
  - Blurry vision
  - Vision loss
  - Pain
  - Tearing
  - Conjuctival erythema

BURN TREATMENT

- Treatment of burns to the eye
  - Irrigate with copious amounts of fluid
  - Cover with dry, sterile dressing
    - If patient can see and can ambulate, do not dress the eye
    - Avoid dressing both eyes, if only one is burned

BURN TREATMENT

- If TACEVAC is delayed
  - Clean the burn with Betadine and 4x4, then rinse with saline
  - Remove loose nonviable tissue
  - Apply Silvadene and cover with loose, dry, sterile dressing
  - Clean and reapply with fresh dressing every 24 hours

CRITICAL BURNS

Critical regardless of depth or TBSA affected:

- Inhalation injuries
- Partial thickness burns > 10% of the TBSA
- Full thickness burns in any age group
- Any burn involving face, hands, feet, genitalia, perineum, or major joints.

CRITICAL BURNS (cont'd)

Critical regardless of depth or TBSA affected:

- Electrical burns, including lightning injury
- Chemical burns
- Injuries of the respiratory tract, other soft tissue injuries, and musculoskeletal injuries

Pain management

- Should be provided to burn victims, and small doses of narcotics should be titrated intravenously.

- Vital signs and respiratory effort are monitored for potential adverse effects. (Note: The use of narcotics is contraindicated in head and spinal trauma.)

- Water immersion may be applied for 10-15 minutes for pain relief, however, caution should be used as it may intensify shock.

MANAGE BURN CAUALTIES

CONDUCT TRIAGE

OVERVIEW

- Principles of Triage
- The Four Categories of Triage
- TCCC Triage Algorithm
- Mass-Casualty Triage
- Triage Tags

LEARNING OBJECTIVES

Please Read Your

Terminal Learning Objectives

And

Enabling Learning Objectives

PRINCIPLES OF TRIAGE

- Sorting casualties into groups based on their immediate medical needs
- Establishes the order of treatment and movement

PRINCIPLES OF TRIAGE

- Accomplish the greatest good for the greatest number of casualties
- Employ the most efficient use of available resources
- Return personnel to duty as soon as possible

CATEGORIES OF TRIAGE

MINIMAL – GREEN TAG

- Walking wounded
- May remain stable for days
- Self/buddy aid
- Types of Injuries Include:
  - Minor lacerations
  - Abrasions
  - Minor burns
  - Small fractures

CATEGORIES OF TRIAGE

DELAYED – YELLOW TAG

- May require surgery, but condition allows a delay in treatment

- <u>Types of Injuries</u>
  - Large soft tissue wounds with no evidence of shock
  - Fractures of major bones
  - Intra-abdominal or thoracic wounds
  - Burns less than 20% of the total body surface area

CATEGORIES OF TRIAGE

IMMEDIATE – RED TAG

- Life threatening
  - The patient WILL die without treatment
- This treatment should:
  - NOT be time consuming
  - Be for casualties that have a high chance of survival

CATEGORIES OF TRIAGE

IMMEDIATE – RED TAG

- Types of Injuries
  - Hemodynamically unstable casualties with airway obstruction
  - Chest or abdominal injuries
  - Massive external bleeding
  - Shock

CATEGORIES OF TRIAGE

EXPECTANT – BLACK TAG

- Low chance of survival
- Time consuming treatment
- Resource consuming treatment

CATEGORIES OF TRIAGE

EXPECTANT – BLACK TAG

- DO NOT abandon these patients
- Provide comfort
- Re-triage after immediate & delayed casualties are treated
- Types of Injuries
  - Penetrating head wounds
  - Blunt head trauma
  - Absent radial pulse

TRIAGE ALGORITHM

- Patients who can walk and talk will usually be minimal category
- Patients with obvious signs of death are expectant
- Massive bleeding is most obvious sign for a live-saving intervention
- Once intervention is performed, re-triage
- Delayed if the patient can follow commands, has a normal radial pulse, and not in respiratory distress

MASS CASUALTY TRIAGE

- Always be prepared to deal with mass casualties
- Establish and rehearse plans
- Remember triage is not treatment, but constant reassessment

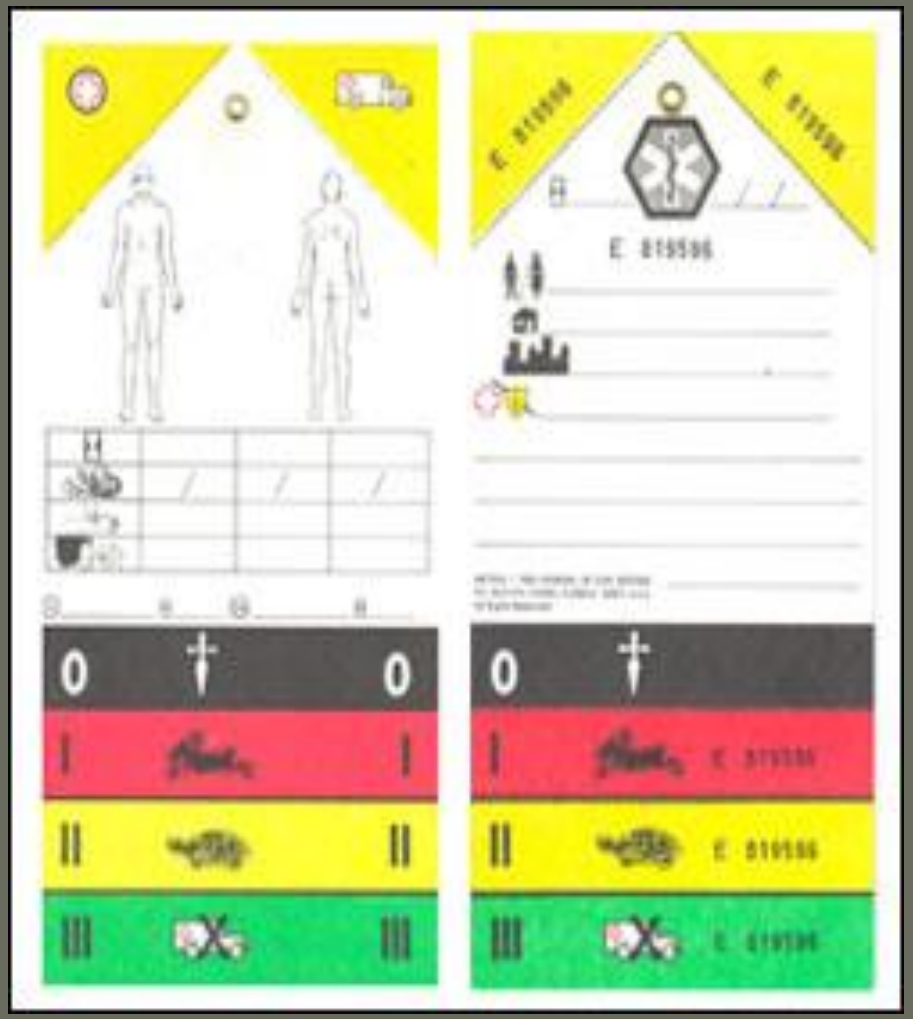
TRIAGE CARDS

METTAG

- Furnishes essential information about injury and treatment provided
- Sole or initial medical record for troops injured in combat
- 7 character serial number identifies and tracks casualties

TRIAGE CARDS

- Stays with the patient at all times
- The yellow corner with ambulance picture and serial number stays with the evacuating vehicle
- The yellow corner with first aid sign and serial number stays with the BAS



CONDUCT TRIAGE

TACTICAL EVACUATION

OVERVIEW

- Taxonomy of Care
- Methods of Evacuation
- Ground Evacuation
- Air Evacuation
- Casualty Receiving Treatment Ships
- TACEVAC Categories
- The 9-Line EVAC

LEARNING OBJECTIVES

Please Read Your

Terminal Learning Objectives

And

Enabling Learning Objectives

TAXONOMY OF CARE

- Distinctive and overlapping care capabilities
- The goal is to evacuate the casualty to the level of care required to meet the needs of the individual.

TAXONOMY OF CARE

- Commences at the scene of injury and continues until:
  - Member receives definitive care
  - Member is discharged
  - Member is returned to duty

FIRST RESPONDER CAPABILITY

- First aid and emergency care rendered at the point of injury
- Immediate medical care and patient stabilization

FIRST RESPONDER CAPABILITY

Examples:

- Self aid
- Buddy aid

FORWARD RESUSCITATIVE CAPABILITY

- Builds on First Responder Capabilities
- Advanced treatment as close to point of injury as possible
- Stabilization for evacuation

FORWARD RESUSCITATIVE CAPABILITY

- Examples include:
  - Medical Battalion
  - Casualty Receiving & Treatment Ships
  - Shock Trauma Platoon (STP)
  - Forward Resuscitative Surgical Suite (FRSS)

THEATER HOSPITALIZATION CAPABILITY

- Highest level of care in combat zone
- Located away from enemy threat
  - Fleet Hospitals
  - Hospital Ships

Fleet Hospital Guantanamo Bay

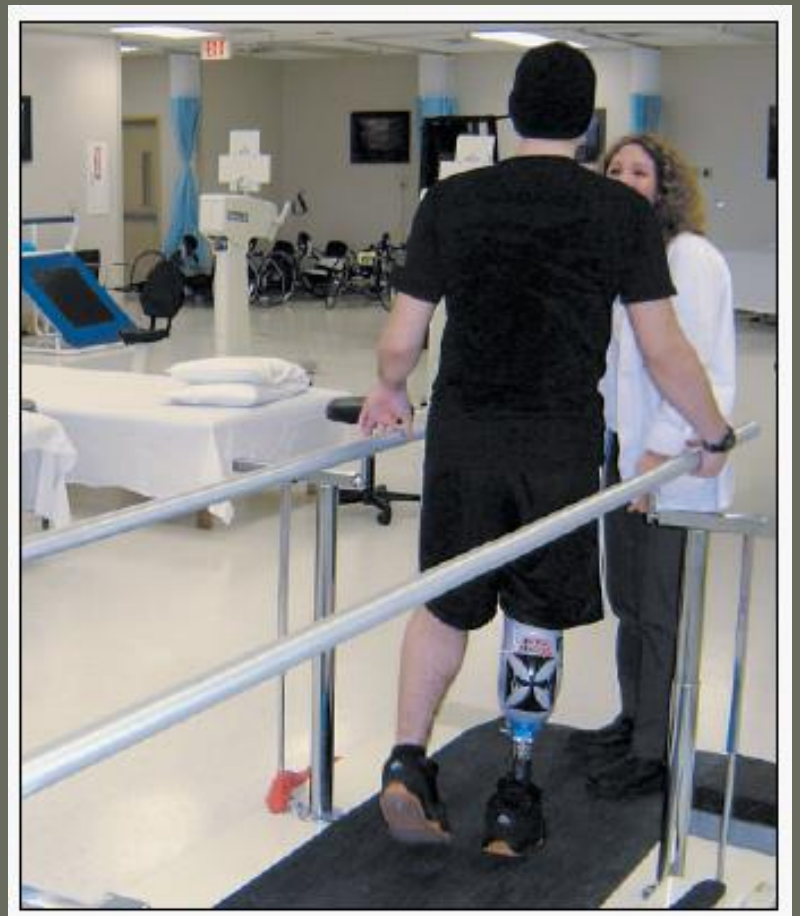
DEFINITIVE CAPABILITY

Definitive Care

Overseas (MTF):

- Comprehensive medical/surgical care
- Definitive care for those who may be RTD within the theater of operations
- Those who cannot RTD will be evacuated via en route care capability

DEFINITIVE CAPABILITY



Wounded soldier receiving rehabilitation care at WRAMC.

- Restorative and rehabilitative care
  - OCONUS MTF
  - In CONUS
    - Military hospitals
    - Veterans Administration Hospitals
    - Selected civilian hospitals

EN ROUTE CARE CAPABILITY

- The continuation of care during evacuation within the continuum without clinically compromising the patient's condition.
  - Casualty Evacuation
  - Medical Evacuation
  - Aeromedical Evacuation

METHODS OF EVACUATION

METHODS OF EVACUATION

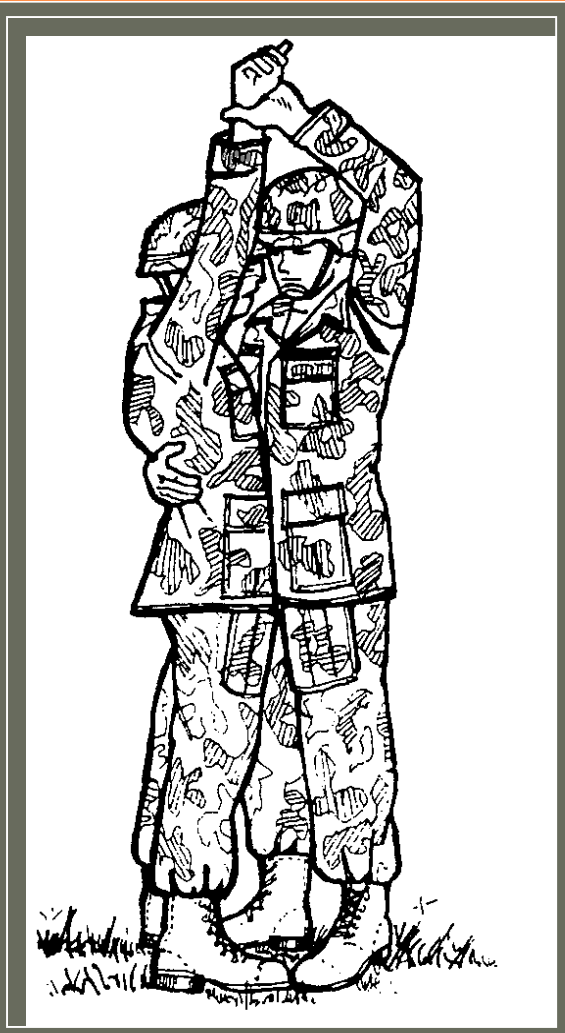
- Manual carries

- AMBULATORY

"Walking Wounded"

FIREMAN'S CARRY

FIREMAN'S CARRY



1

2

3

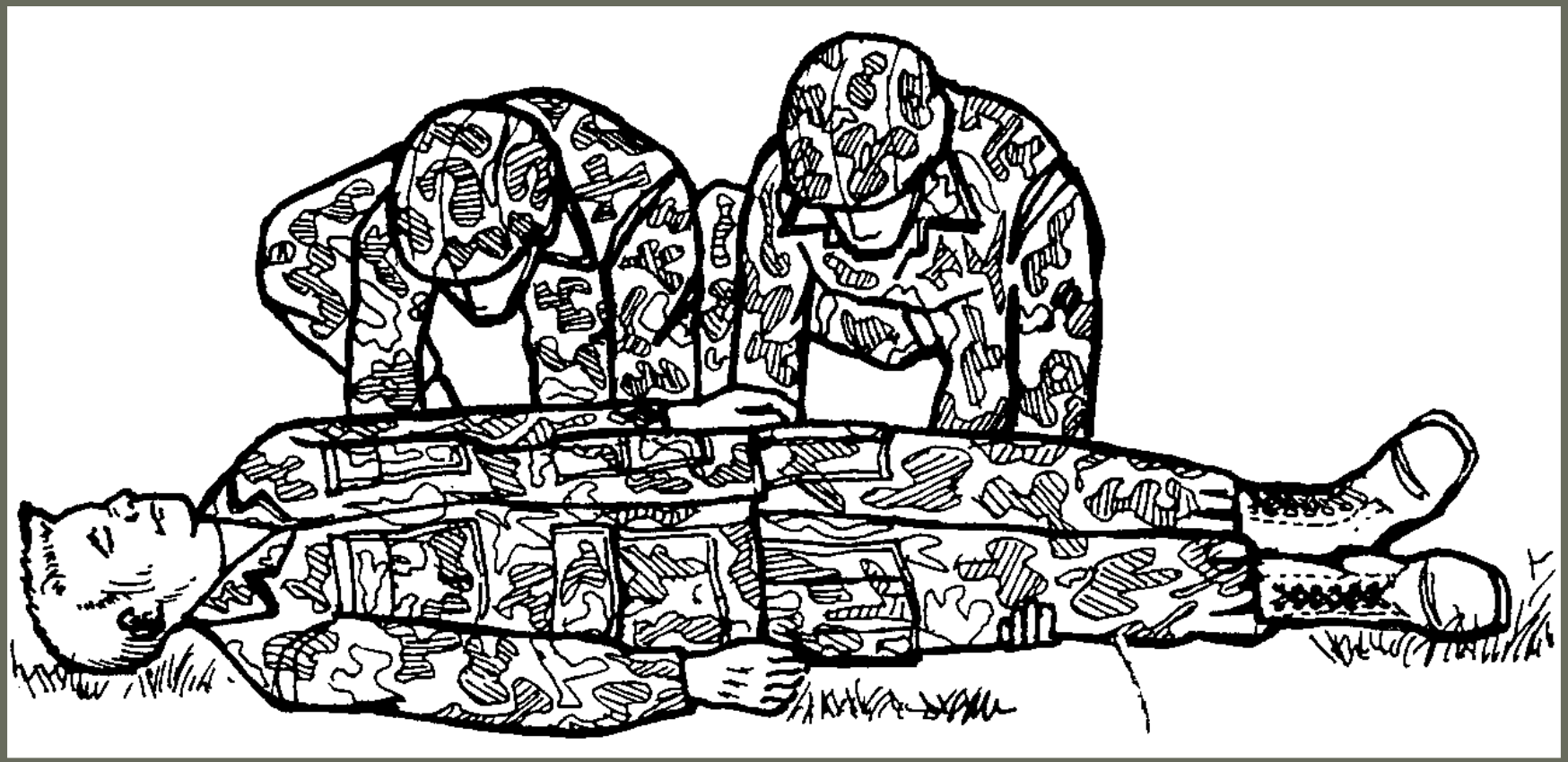
ONE-MAN SUPPORTING CARRY

SADDLE BACK CARRY

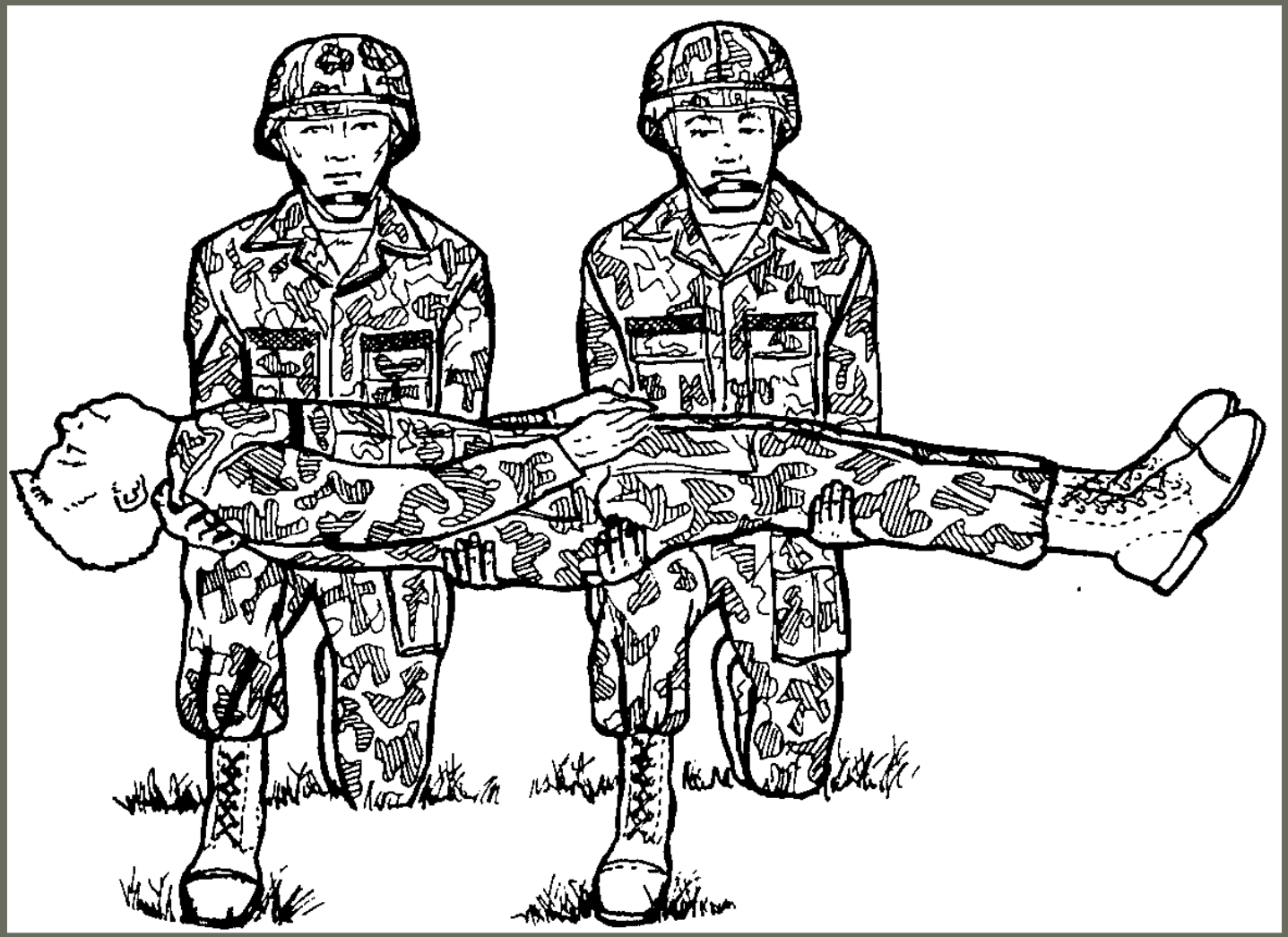
PACK STRAP CARRY

TWO MAN SUPPORT CARRY

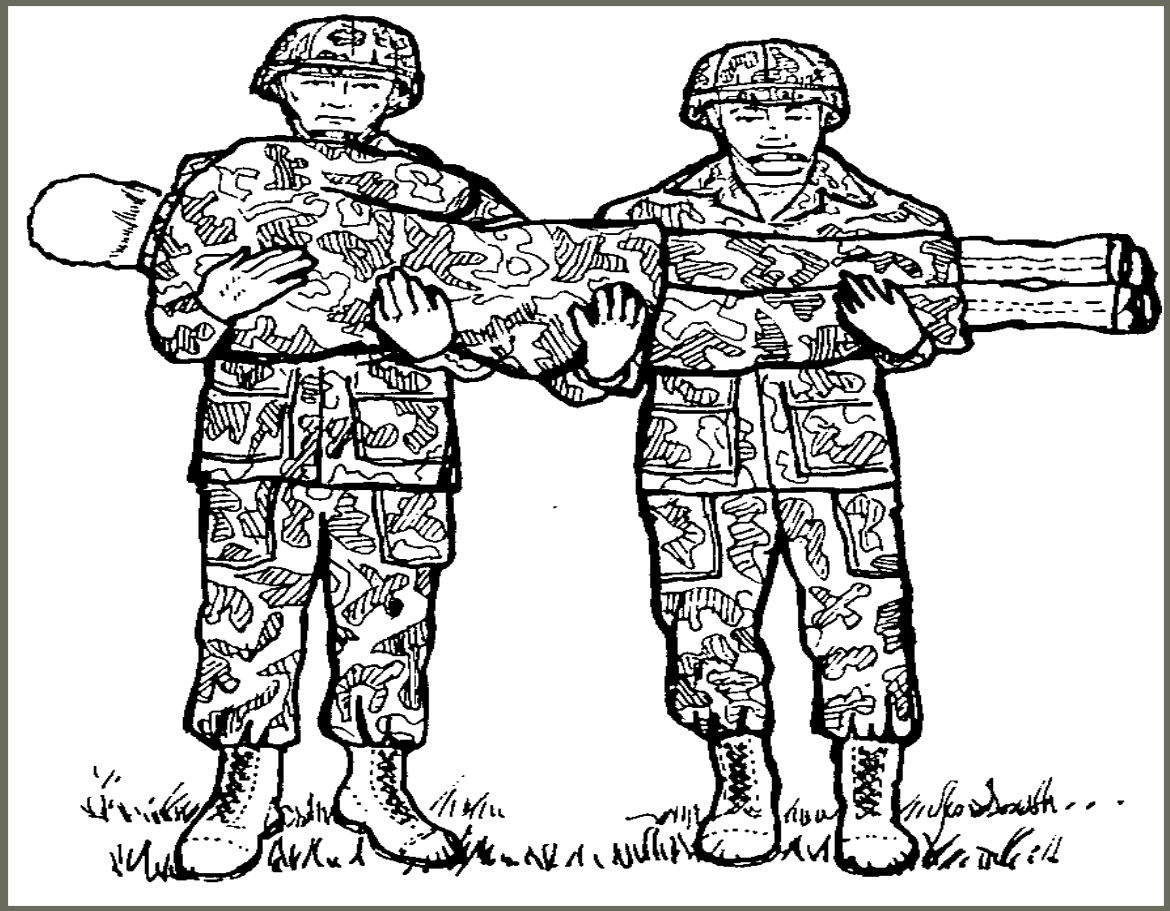
TWO MAN CARRY STEP A



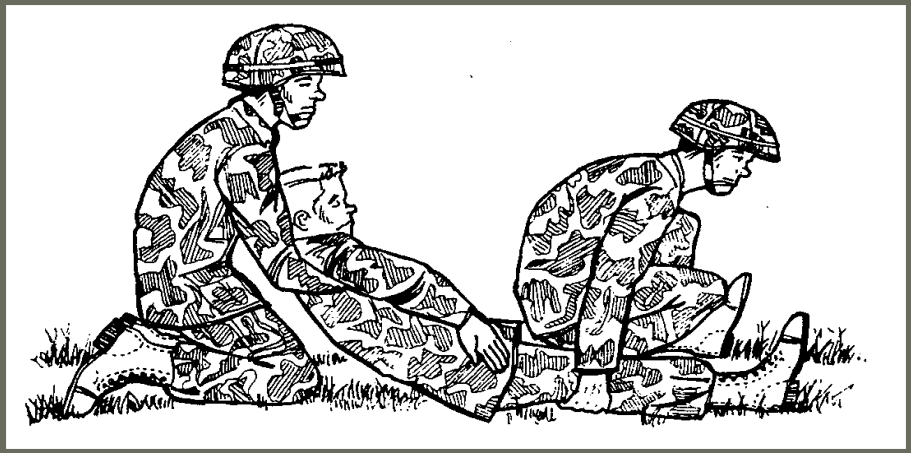
TWO MAN CARRY STEP B



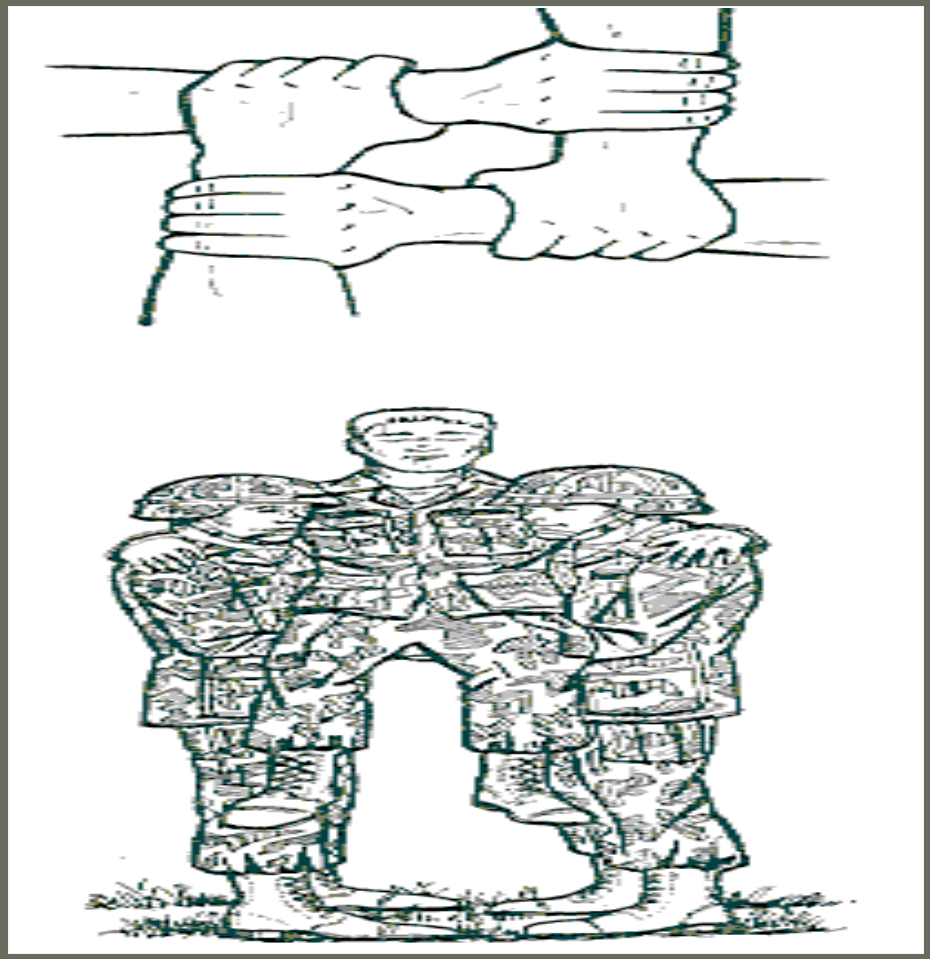
TWO MAN CARRY STEP C



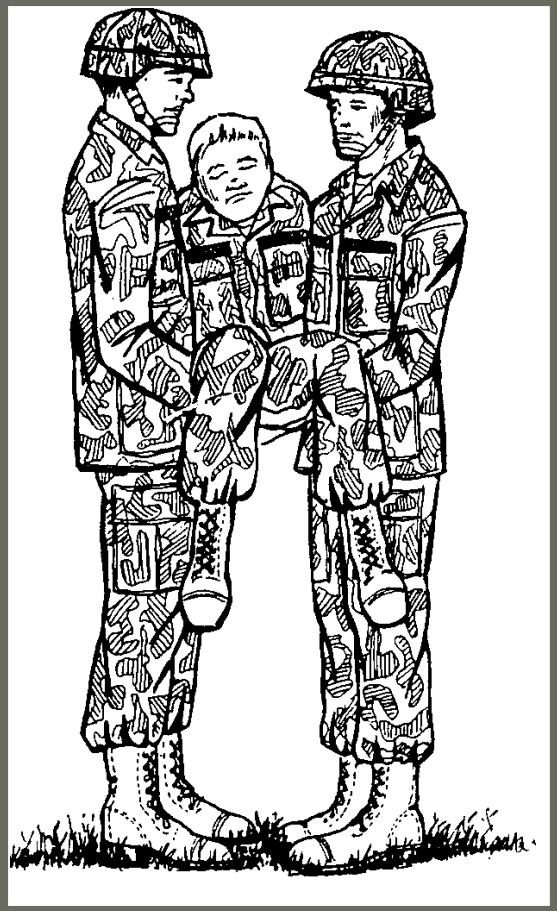
FORE/AFT CARRY



FOUR-HAND CARRY



TWO HAND SEAT CARRY



TWO-HAND SEAT CARRY

CLOTHES DRAG

METHODS OF EVACUATION

- Litter transportation
  - Talon Litter
  - Army Litter
  - Stokes Litter
  - Pole-less litter
  - Miller Board
  - Improvised litters

TALON LITTER

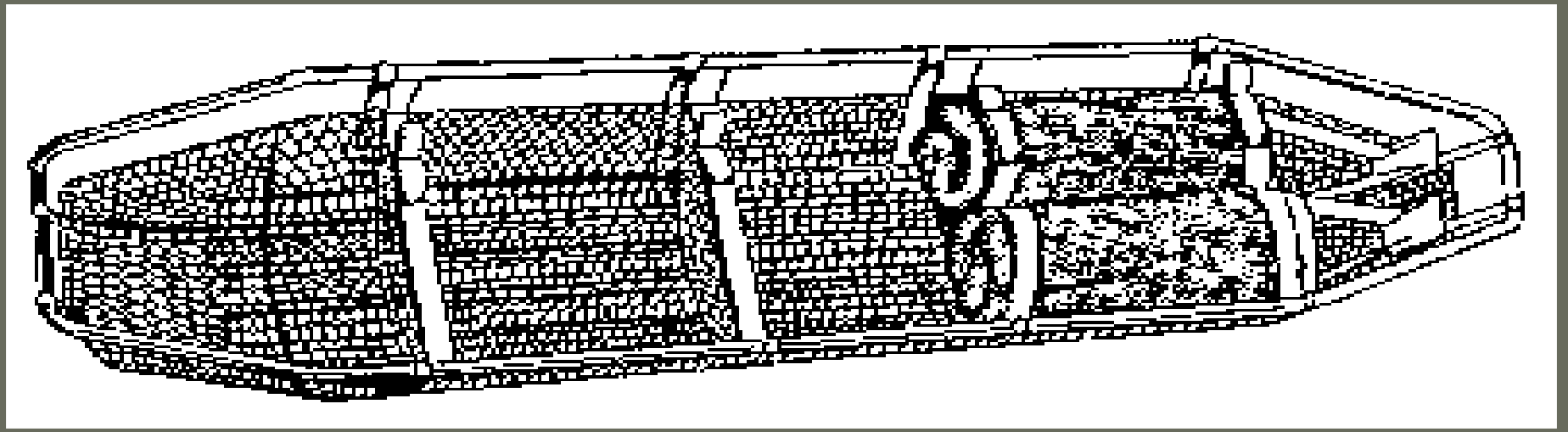
- Most commonly used litter
- Developed to meet urgent requirement to provide casualty evacuation
- No need to transfer casualty from one litter to another

STANDARD ARMY LITTER

Does not fold in half, only collapsible the long way

STOKES LITTER

- Maximum protection for the patient when litter is tilted



POLE-LESS LITTER

- Can be folded and carried by field corpsmen
- Poles can be inserted for carrying long distances

MILLER BOARD

- Can be used for confined space and vertical extrication
- Fits in stokes stretcher
- Will float a 250-pound person

IMPROVISED LITTERS

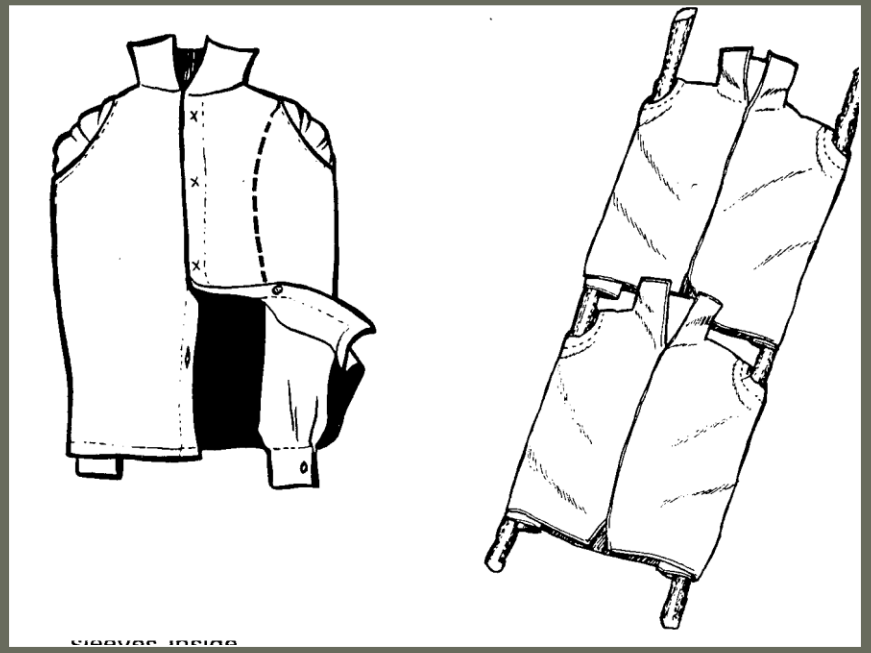
- Used in emergencies when
  - Standard litters are not available
  - Distance too far for manual carries
  - Injury would be aggravated by manual carry
- Must be replaced by standard litter ASAP

IMPROVISED LITTERS

Example: Blankets / Ponchos

IMPROVISED LITTERS

Example: Flak Jacket



LITTER EVAC PROCEDURES

- Movement deliberate and gentle
- Keep litter level and steady
- Carry feet first
  - Except going uphill/stairs
- Load *head first* into vehicles
- Carry patient's equipment or place on litter

M-997 AMBULANCE

M-997 AMBULANCE

- 4 litter or 8 ambulatory
- Protects against small arms fire

M-997 AMBULANCE

M-1035 AMBULANCE

- 2 litter and 3 ambulatory
- HMMWV frame with a removable soft top

MK23 (7-TON)

Can transport 10 litter or 20 ambulatory casualties

CH-46 (SEA KNIGHT)

Can carry 15 litter patients or 22 ambulatory casualties


4827
04

UH-1 (HUEY)

Able to carry 6 litters or 10 ambulatory casualties

MV-22 (OSPREY)

When configured with litter racks, able to carry 12 litters or 24 ambulatory

CH-47 (CHINOOK)

When configured, can carry 24 litter patients or 31 ambulatory casualties

UH-60 (BLACKHAWK)

Can carry 6 litters with modification kit or 7 without modification kit.

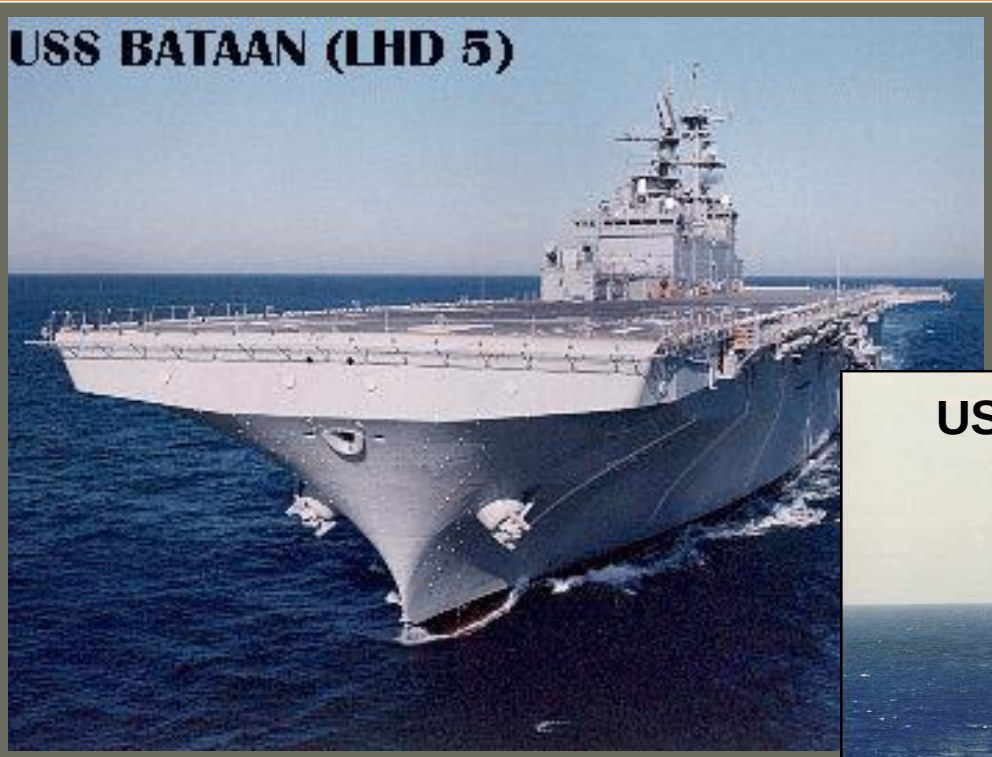
AIR EVACUATION PLATFORMS

- USMC has NO dedicated air casevac platforms
- All aircraft are used as a “lift of opportunity”

HELICOPTER EVACUATION

- ADVANTAGES
  - Decreased time lapse between initial treatment and definitive care
  - Increases the casualty's chance of survival

CASUALTY RECEIVING TREATMENT SHIPS



CASUALTY RECEIVING TREATMENT SHIPS

- Mission
  - Assault via helo, landing craft and amphibious vehicle
  - Primary amphibious landing ships for MEFs, MEB's and MEU's
  - Primary CRTS

Landing Helicopter Assault and Dock Landing Ship (LHA/LSD)

- Transport Capabilities
  - Flight deck with large hanger deck and a well deck
  - Receives casualties via helos or waterborne craft
- Medical Capabilities
  - LHD has the largest medical capability of Amphibious Ships (LHA is second)

T-AH

- COMFORT and MERCY
- Mobile, flexible, rapidly responsive afloat medical capability
- Provide full-service hospital asset for use by other government agencies in support of disaster relief and humanitarian operations

T-AH

- Transport Capabilities
  - Flight deck capable of receiving rotary wing aircraft
- Medical Capabilities
  - 12 ORs
  - 100 ICU beds
  - 400 Immediate care beds
  - 500 Ward beds

CASEVAC CATEGORIES

- URGENT
  - Evacuation to save life or limb
  - Life threatening injuries
  - Evac must occur within 2 hours
- URGENT SURGICAL
  - Wounds that will require surgical intervention
  - Patients must be taken to a facility that can perform the procedure needed
  - Evac must occur within 2 hours

CASEVAC CATEGORIES

- PRIORITY
  - Serious but not currently life threatening injuries
  - Evacuation should occur within 4 hours or patient could become an URGENT

CASEVAC CATEGORIES

- ROUTINE
  - Evacuation is needed to complete full treatment
  - Evacuation may occur within 24 hours

CASEVAC CATEGORIES

- CONVENIENCE
  - Patients moved for administrative purpose

- During evacuation of patients, ensure that they are kept warm!!!!

PREVENT HYPOTHERMIA!!!!!

9 LINE CASEVAC REQUEST

- Standard format used to request a CASEVAC
- Speak clearly
- Use only authorized brevity codes
- Don’t need to memorize, use pocket card

9 LINE CASEVAC REQUEST

Line 1. Location

Line 2. Radio Freq and Call sign

Line 3. Precedence (Urgent, Urgent Surgical Priority, Routine, Convenience)

Line 4. Special Equipment

Line 5. Number of Patients by type

Line 6. Security of pick up site

Line 7. Method of marking site

Line 8. Patient's Nationality and status

Line 9. NBC Contamination

9 LINE CASEVAC REQUEST

Example:

- Pitchfork Six this is Blue Thunder over.
- Blue Thunder this is Pitchfork Six, go ahead
- Pitchfork six, standby for CASEVAC REQUEST over.
- Roger, standing by to copy CASEVAC Request

9 LINE CASEVAC REQUEST

1. Line 1 Delta Hotel one two tree four, fife six seven eight
2. Line 2 niner niner six fife, Blue Thunder
3. Line 3 Bravo One, Charlie One
4. Line 4 Alpha

Break

9 LINE CASEVAC REQUEST

5. Line 5 Lima 1, Alpha 1
6. Line 6 November
7. Line 7 Charlie
8. Line 8 Alpha 2
9. Line 9 none

Over

TACTICAL EVACUATION

DEMONSTRATION

TACTICAL EVACUATION

AID STATION PROCEDURES

1st Battalion, 11th Marines BAS- FB Fiddlers Green, Afghanistan

OVERVIEW

- Mission
- Area of Responsibilities in various environment
- Medical Support in various environment
- Equipment
- Health Service Support of MEF, MAW, MARDIV and MLG

LEARNING OBJECTIVES

Please Read Your

Terminal Learning Objectives

And

Enabling Learning Objectives

MISSION OF THE AID STATION

- Overall Mission is to be the primary health service support for a unit!
- Mission changes depending on where the unit is operating (Garrison or Field)
- Regardless, the Aid Station will provide direct medical support to Marine Corps personnel.

AREAS OF RESPONSIBILITIES

- Aid stations are based on mission of the unit.

- Large units have more staffing.
  - Infantry Battalion may have up to 2 Medical Officers and 65 Corpsmen while Tank Battalion could have no Officer and fewer Corpsmen.

AREAS OF RESPONSIBILITIES

- <u>Infantry Battalion Aid Station:</u>

- 2 Medical Officers
  - Battalion Surgeon and Assistant Battalion Surgeon

AREAS OF RESPONSIBILITIES

- <u>Infantry Battalion Aid Station:</u>

- HSS is supported by a Religious Ministry Team (RMT)

  -Consist of Chaplain and Religious Programs Specialist (RP).

AREAS OF RESPONSIBILITIES

Infantry Battalion Aid Station:

-65 total Corpsmen

-11 in Headquarters and 54 in line companies

MEDICAL SUPPORT

While in Garrison:

- Maintain medical and dental readiness
- Conduct sick call
- Medical administration (Limited Duty Boards, medical discharges, etc.)
- Maintain supplies
- Provide medical coverage for training
- Train non-medical personnel

MEDICAL SUPPORT

While in Field/Combat

- Conduct sick call
- Conduct triage
- Treat casualties
- Document treatment
- Provide temporary shelter
- Return patients to duty

MEDICAL SUPPORT

While in Field/Combat

- Transfer evacuees from BAS to evacuation transportation
- Initiate treatment for combat stress
- Maintain health records
- Provide for replacement of personnel and/or supplies

MEDICAL SUPPORT

While in Field/Combat:

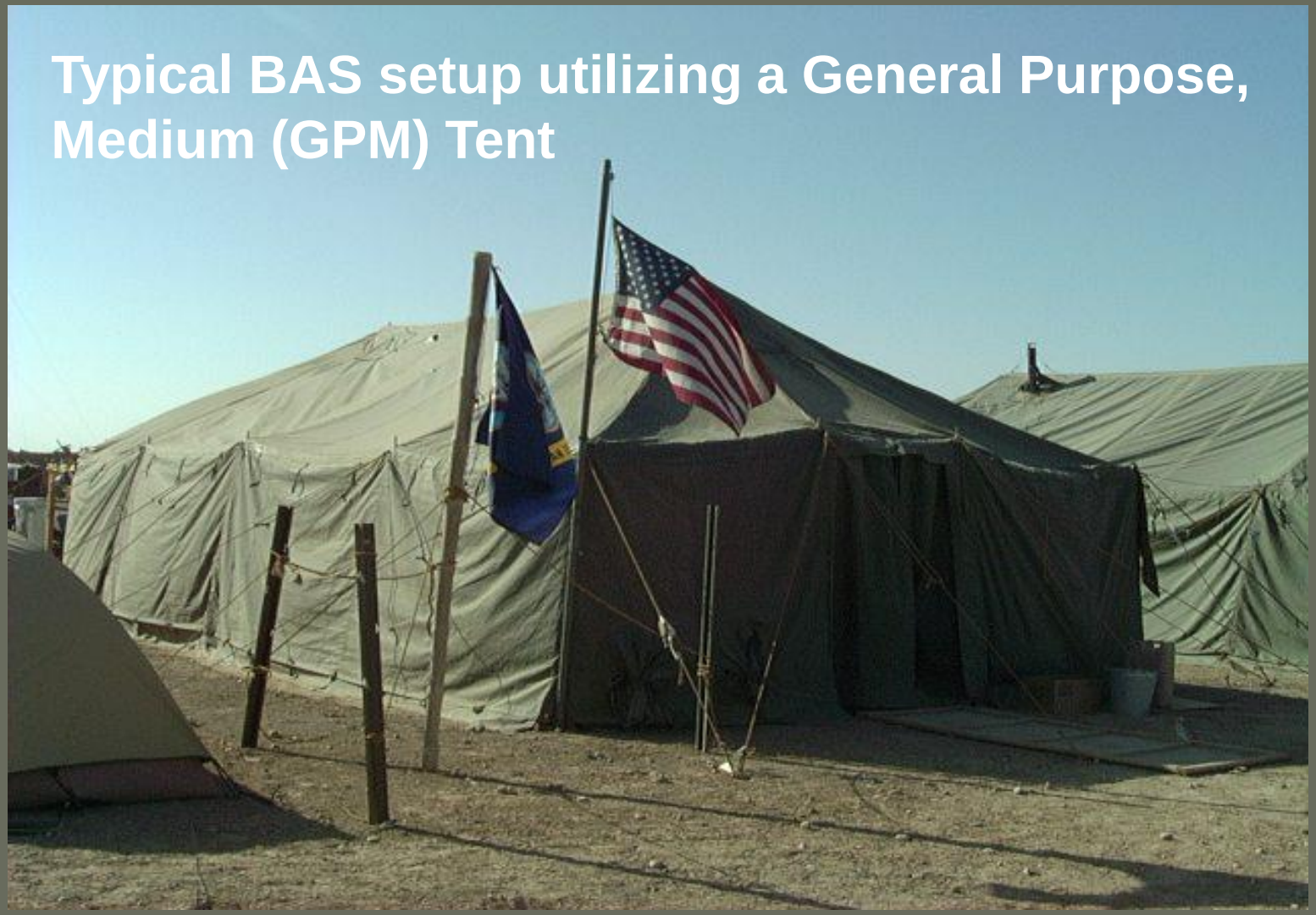
- BAS is structured to split into 2 Stations and leapfrog as line of combat advances.
- Alpha BAS moves forward with battalion (headed by Battalion Surgeon)

MEDICAL SUPPORT

- Bravo BAS (headed by Assistant Battalion Surgeon) provides continuing care until CASEVAC complete or until a Shock Trauma Platoon (STP) arrives

- This allows for a continuity of care as the BAS advances

Typical BAS setup utilizing a General Purpose, Medium (GPM) Tent

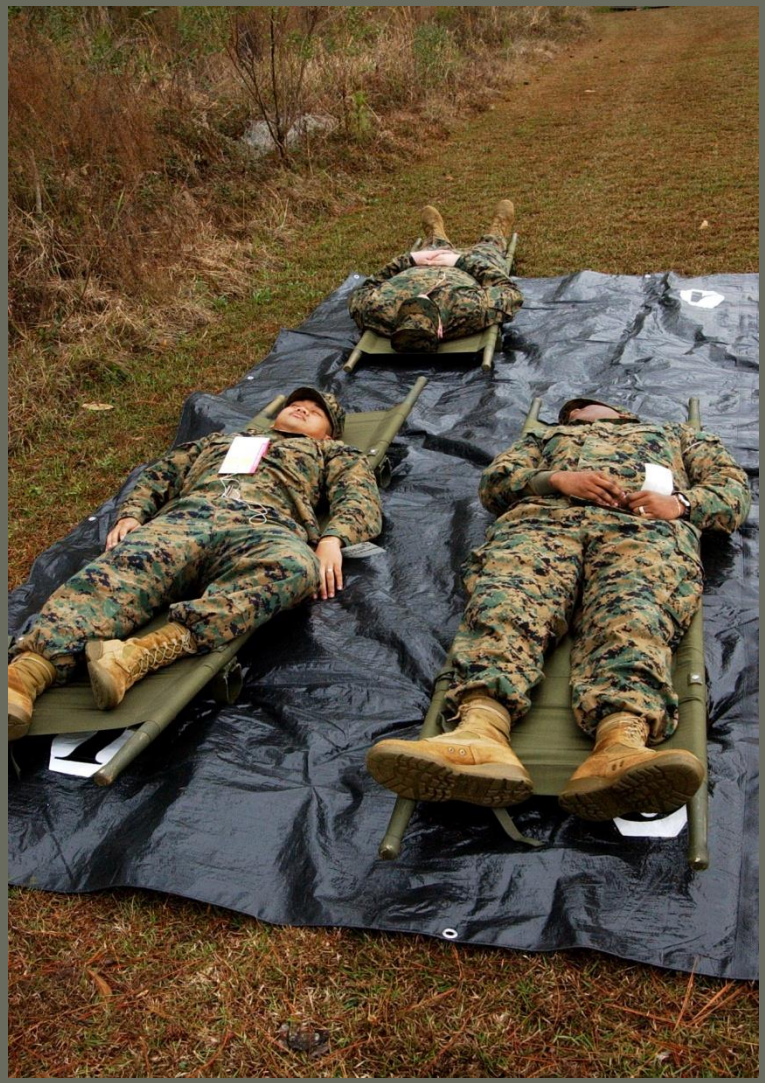


MEDICAL SUPPORT

- Internal Security
  - Provides perimeter security
  - Searches patients for weapons munitions and/or booby traps
  - Ensures no weapons in BAS

MEDICAL SUPPORT

- Triage
  - Sorts incoming patients
  - Limited first aid provided
  - Initiates/continues documentation
  - Provide comfort for injured or dying



MEDICAL SUPPORT

- Treatment Area
  - Any area designated by MO
  - Where treatment takes place

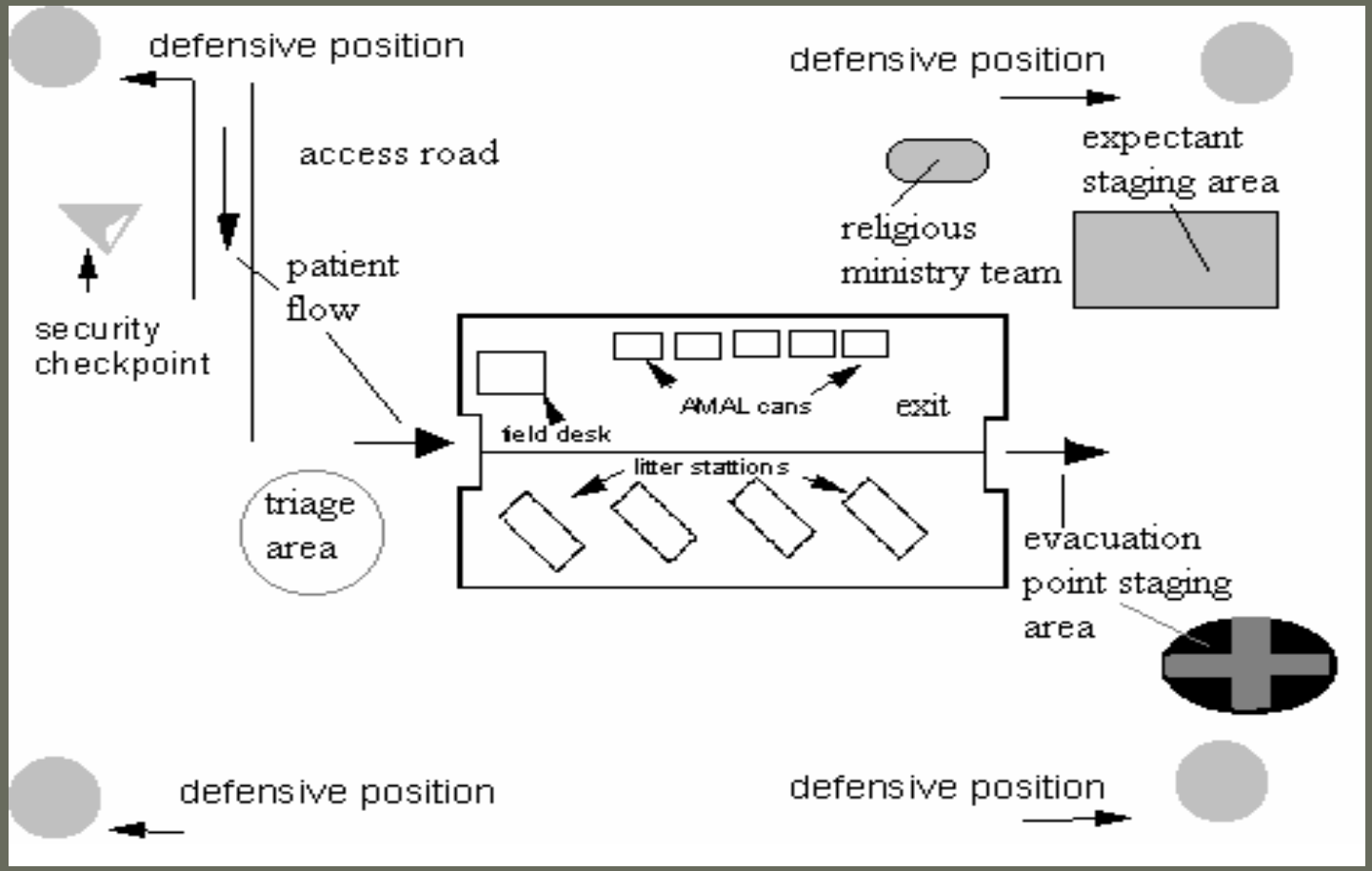
MEDICAL SUPPORT

- Evacuation Area
  - Staging area for CASEVAC
  - Care continues
  - Report casualties and send CASEVAC requests

MEDICAL SUPPORT

- Expectant Area
  - For those not expected to survive injuries
  - Supportive medical care provided
  - Religious Ministry Team for last rites

MEDICAL SUPPORT



Typical BAS Setup

MEDICAL SUPPORT

- Battalion Surgeon
  - Supervises patient treatment, planning, and organization
  - Educates battalion medical staff
  - Duties as directed by the battalion commander

MEDICAL SUPPORT

- Assistant Battalion Surgeon
  - Directs, manages, and supervises the operation of the BAS.
  - Performs such additional duties as may be assigned by the Battalion Surgeon.

MEDICAL SUPPORT

- Battalion Chief
  - Oversees all matters concerning;
    - Administration and logistics
    - Ensure appropriate HSS & logistical support is provided for operational commitments
    - Advises Battalion Surgeon on all matters related to the BAS or battalion medical personnel

EQUIPMENT

- Logistics is dealing with the procurement, storage, distribution, inventory, and maintenance of supplies.
- Supplies and equipment are divided into ten classes for management purposes.
- Class VIII supplies are medical related items.

EQUIPMENT

- Medical Planning considerations are based on the following:
  - Concept of Operation/scheme of maneuver
  - Combat Intensity
  - Duration of Operation
  - Casualty Estimates

EQUIPMENT

- Table of Equipment (T/E)
  - Items necessary for basic support of the organization
    - Tents
    - Vehicles
    - Tools
    - Communication gear
    - NBC gear
    - Office equipment and supplies

EQUIPMENT

- Authorized Medical Allowance List (AMAL)
  - A list of authorized allowances of equipment and consumable supplies required to perform medical support
  - Many different types depending on mission

EQUIPMENT

- AMAL 635 (Equipment)
  - Aid Station equipment and reusable material supporting HSS of the BAS.

    Examples:
    - Litters
    - Litter Stands
    - Blanket
    - Instruments

EQUIPMENT

- AMAL 636 (Consumables)
  - Consumable items that are needed to support the medical mission of the BAS.

Examples:

- IV solutions
- Bandages/Gauze
- Medication
- Oxygen masks
- Gloves
- Dressings

EQUIPMENT

- Authorized Dental Allowance List (ADAL)
  - A list of authorized allowances of equipment and consumable supplies required to perform dental support.
  - Just like AMALs, there are many different types varying with the mission requirement.

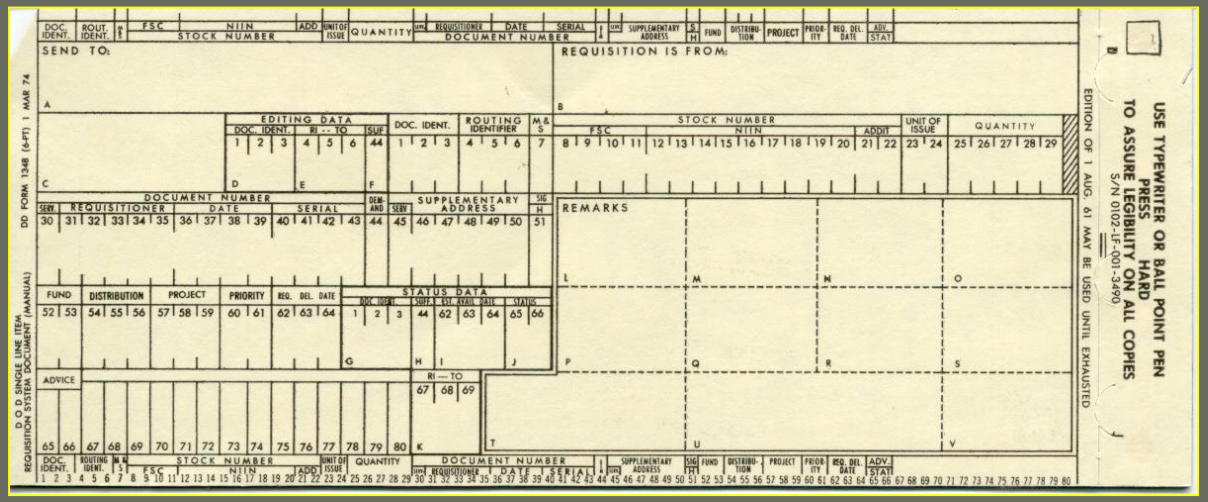
EQUIPMENT

ADAL 662 Field Dental Items

- Equipment needed to establish a field dental clinic.

EQUIPMENT

DD-1348



- Form used to request supplies
- Used primarily by the BAS corpsman to order supplies by line item only
- Used to re-stock the equipment and consumable AMAL/ADAL

EQUIPMENT

- Line Items- Items having a National Stock Number (NSN)

Most everything in the military has a NSN

EQUIPMENT

- Medical Logistics Company (MEDLOG)
  - Medical supply source to all units within a MEF
  - Maintains all AMAL's and ADAL's while in garrison

HSS COMPONENTS OF MEF

<u>Consist of:</u>

-MEF Surgeon
-Medical Admin Officer
-Preventive Medicine Officer
-Hospital Corpsmen

-Responsible for supporting all components within a MEF (MAW, MARDIV, MLG)

HSS COMPONENTS OF MAW

Consist of:

-Wing Surgeon
-Medical Admin Officer
-Environmental Health Officer (EHO)
-Industrial Hygienist
-Optometrist
-Hospital Corpsman

HSS COMPONENTS OF MAW

- Each MAW has 4 Marine Air Groups (MAG's)

Each MAG:
-Flight Surgeon and HM's

HSS COMPONENTS OF MARDIV

Components vary in MARDIV due to size and mission of units

Element	Officer	Enlisted
Division HQ	7	17
Infantry Regiment	11	201
Infantry Battalion	3	66
Tank Battalion	2	31
Assault Amphibian Battalion	2	21
Artillery Regiment	23	59
Artillery Battalion	5	13
Combat Engineer Battalion	2	26
Light Armored Reconnaissance Battalion	3	66
Headquarters Battalion	8	41
Force Reconnaissance Company	0	9

HSS COMPONENTS OF MLG

- Is the biggest portion of the MEF's medical capability

- Consists of:

  -Group Surgeon

  -Health Service Support Officer

HSS COMPONENTS OF MLG

- Medical Battalion within MLG:
  - Has 3 Surgical C

    Each Surg CO has 8 Shock Trauma Platoons (STP's)

- Dental Battalion also a part of MLG

Demonstration

Practical Application

AID STATION PROCEDURES

1st Battalion, 11th Marines BAS- FB Fiddlers Green, Afghanistan

MEDICAL SUPPORT FOR

MILITARY OPERATIONS IN URBAN TERRAIN (MOUT)

OVERVIEW

- MOUT Defined
- Health Threats in MOUT
- Casualty Evacuation
- Operating in MOUT Environment

LEARNING OBJECTIVES

Please Read Your

Terminal Learning Objectives

And

Enabling Learning Objectives

DEFINITION of MOUT

- Background
  - Battles fought on urbanized terrain
    - Beirut, Panama City, Mogadishu, Iraq
  - Quick adaptation to each mission, terrain, and situation is necessary

DEFINITION of MOUT

- Military actions planned and conducted on a terrain where man-made structures impact the tactical options available to the commander.

- This terrain is characterized as a four-dimensional (air, buildings, streets, and subways) battlefield with the following features:
  - Considerable rubble
  - Ready-made fortified fighting positions
  - An isolating effect on all combatants

HEALTH THREATS OF MOUT

HM3 James D. Cabrera, left, and Cpl. Luis A. Valadez, 1st Battalion, 12th Marine Regiment, scan the area around a building near Combat Outpost Golden, Iraq, Sept. 2007.

HEALTH THREATS OF MOUT

- The medical threat in MOUT presents unique challenges to Health Services personnel.

- Each of the tactical considerations requires a parallel plan for medical response.

- Combat in urban terrain can complicate the ability of medical personnel to provide timely, sustainable support.

HEALTH THREATS OF MOUT

- Expect increased casualties
- Units may be spread out across large areas
- Unit training in self-aid and buddy-aid

HEALTH THREATS OF MOUT

Potential Health Threats of MOUT include.

- Isolation and reduced response to casualties
- Imposition of civilian casualties and refugees
- Undefined line of battle that delays medical treatment
- Mass casualty/casualty overload situations
- Communicable disease endemic to the area
- Lack of water and sanitation
- Combat stress
- NBC environment

HEALTH THREATS OF MOUT

- Psychological Casualties
  - Due to lengthy exposure to combat situations
  - Prolonged fear
  - Be prepared to treat these casualties

Marines assigned to 3rd Battalion, 3rd Marine Regiment, search a house for insurgents, weapons caches and explosives during a patrol June 2006, in Barwana, Iraq.

HEALTH THREATS OF MOUT

- Civilian Casualties
  - Prepare for large numbers of civilian casualties
  - Prepare for different age groups
    - Geriatrics
    - Pediatrics

HEALTH THREATS OF MOUT

- Infectious Diseases
  - Animals: carry diseases (rats, mice, dogs)
  - People: may not have active immunization program in local area
  - Water: limited water supply places troops at increased risk of drinking unclean water

CASUALTY EVACUATION

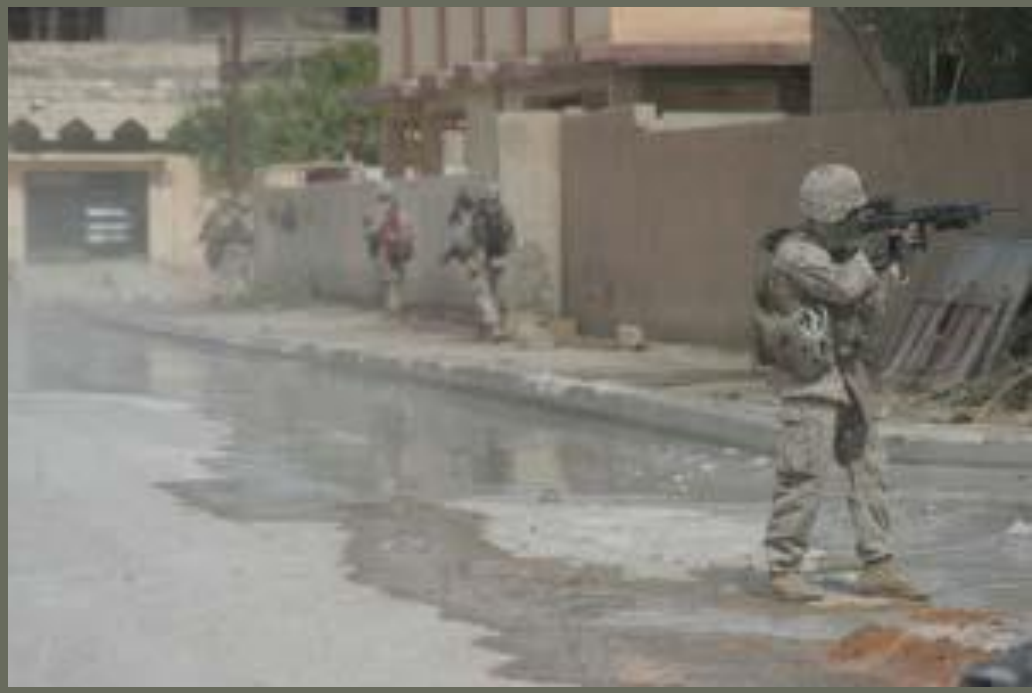
- Casualty Evacuation
  - Can be difficult and time consuming
  - Ground evacuation requires heavy armor
  - Air evacuation is difficult

CASUALTY EVACUATION

- Special Equipment
  - Finding casualties
  - Crumbled buildings
  - Vehicle crashes
  - Tools to help:
    - Axes
    - Cutting tools
    - Crowbars
    - Jacks
    - Ropes

OPERATING IN A MOUT

- Terrain
- Rules of Engagement



AR RAMADI, Iraq – A Marine with 2nd Platoon, A Company, 1st Battalion, 5th Marine Regiment, posts security down a street during a patrol. **04/2005**

OPERATING IN A MOUT

- Terrain
  - Enemy observation positions are likely
  - Assaulting forces can quickly become isolated, confused, and cut-off
  - Structures typically have multiple floors, rooms, and doorways

OPERATING IN A MOUT

- Rules of Engagement
  - May change daily or based on the situation
  - Designed to:
    - Avoid alienation of the local population
    - Reduce the risk of adverse world opinion
    - Preserve structures and facilities for future use
    - Preserve vital cultural facilities and grounds

MEDICAL SUPPORT FOR

MILITARY OPERATIONS IN URBAN TERRAIN (MOUT)