DEHYDRATION
OVERVIEW

• Predisposing Factors
• Signs and Symptoms
• Treatment
• Preventive Measures
• Hyponatremia
LEARNING OBJECTIVES

Please read your Terminal Learning Objectives and Enabling Learning Objectives.
INTRODUCTION

• Water
  – 45 - 70% of body weight
  – Used to carry out normal functions
    • Respiration
    • Elimination of waste
    • Lubrication
    • Regulate body temp
INTRODUCTION

• Excessive changes in the normal body water balance alter homeostasis

• Vital organs cannot function properly without the correct amount of water and sodium
PREDISPOSING FACTORS
PREDISPOSING FACTORS

- Alcohol consumption
- Medications
- High BMI / Low Fitness Level
- Inadequate diet
- Improper clothing
PREDISPOSING FACTORS

• Medical conditions
• Age
• Fatigue / lack of sleep
• Improper acclimatization
SIGNS AND SYMPTOMS
SIGNS AND SYMPTOMS

• Mild to moderate dehydration:
  – Fatigue
  – Headache
  – Decreased heat tolerance
  – Cognitive deterioration
  – Reduction in strength and physical capacity
 SIGNS AND SYMPTOMS

• Other common S/Sx:
  – Less frequent urination/dark color urine
  – Thirst
  – Lightheadedness
  – Dry skin
  – Decreased turgor
SKIN TURGOR

Skin with decreased turgor remains elevated after being pulled up and released.
SIGN AND SYMPTOMS

• Other common S/Sx (cont):
  – Dizziness
  – Confusion
  – Dry mouth and mucous membranes
  – Increased heart rate and breathing
TREATMENT
TREATMENT

• Identify and treat the cause
• Assess the level of dehydration based on the signs and symptoms
• Re-hydrate:
  – Mild: Oral hydration (If able to tolerate)
  – Moderate and Severe: IV Fluid Replacement
• Do not over hydrate
PREVENTIVE MEASURES
PREVENTIVE MEASURES

• Before activities
  – Drink extra fluids to produce straw colored urine

• During activities
  – Several fluid breaks per hour
  – 1 qt per hour
  – No more than 1.5 liter per hour
PREVENTIVE MEASURES

• Maintain a balanced diet
  – MRE’s are formulated to provide important electrolytes and other nutrients
PREVENTIVE MEASURES

• Avoid diuretic beverages
  – Minimize consumption of alcohol, coffee, tea and caffeinated beverages

• Educate troops
  – Key to prevention
  – Eliminate myths
HYPONATREMIA
Hyponatremia is a low sodium level in the blood and can occur when

- Sodium and water is lost from sweat
- Excessive water intake = over dilution of sodium in the blood

Disturbs the osmotic balance and can cause a rapid influx of water into the brain
HYPONATREMIA

• Signs / Symptoms

– Headache
– Malaise
– Nausea
– Confusion/Mental status changes
– Seizures
– Coma
– Permanent brain damage
– Death
HYPONATREMIA

• Risk Factors:
  – Exercise duration of greater than 4 hours
  – Low body weight
  – Overhydration
  – NSAID use
  – Extreme hot or cold environments
HYponatremia

• Treatment:
  – Recognize the disorder and determine severity
  – Mild symptoms
    • Observe
  – Symptomatic
    • Place in an upright position
    • TACEVAC
    • Only treated by an MO
HYponatremia

• Prevention:
  – Education
  – Do not restrict sodium intake
  – Do not rely solely on water
Dehydration
ENVIRONMENTAL HEAT INJURIES
OVERVIEW

• Predisposing Factors
• Types of Heat Injuries
• Methods of Cooling the Body
• Preventive Measures
• Flag Warning System
Please read your Terminal Learning Objectives and Enabling Learning Objectives
• High internal temperatures can produce stress on the body

• If not counterbalanced, these high body temperatures can produce injury or death

• Heat injuries can occur anywhere, but are more frequent in warm weather due to high temperatures, humidity and sunlight
BODY TEMPERATURE REGULATION

• Hypothalamus
  – Regulates the body’s CORE temperature, not surface temperature
  – Can tell the body to either:
    • Conserve heat
    • Dissipate heat by increasing RR, cardiac output, vasodilation and perspiration

• Normal Range
  – 97.6°-99.6°F
Predisposing Factors Associated with Heat Injuries
PREDISPOSING FACTORS

• Chronic Conditions:
  – Fitness and Body Mass Index
    • Low levels of physical fitness reduce heat tolerance
  – Age
    • Thermoregulatory capacity and heat tolerance diminish with age
PREDISPOISING FACTORS

• Chronic Conditions (cont):
  
  – Medical Conditions
    • Diabetes, thyroid disorders, renal disease increase the risk for heat intolerance and injury
    • Cardiovascular disease and circulatory problems are aggravated by heat exposure

  – Previous History of Heat Injury
    • May cause permanent damage to the hypothalamus
PREDISPOSING FACTORS

• Chronic Conditions (cont):
  – Skin Trauma
    • Hampers the heat regulatory mechanism
    • Sunburn, heat rash, windburn, dermatologic disease
  – Medications
    • Increase metabolic heat production
    • Suppress body cooling
    • Reduce cardiac reserve
    • Alter electrolyte and fluid balance
PREDISPOSING FACTORS

• Transient Conditions
  – Poor acclimatization
  – Illnesses
    • Colds
    • Fever
    • Vomiting
    • Diarrhea
TYPES OF HEAT INJURIES
HEAT CRAMPS

• Definition:

  – Short-term, painful muscle contractions

  – Frequently seen in the calf muscles and voluntary muscles of the abdomen and extremities
HEAT CRAMPS

• Cause:
  – Prolonged physical activity in hot climates
  – Muscle fatigue
  – Body water loss
  – Sodium loss
HEAT CRAMPS

• Signs/Symptoms:
  – Muscle cramps and tenderness
  – Skin is usually moist, pale, warm
  – Normal or slightly elevated core temp
• **Treatment:**
  
  – Rest in cool environment
  
  – Prolonged stretching
  
  – Consume oral fluids and foods containing sodium

  • Electrolyte pouches, sports drinks, salty snacks
• Definition:
  – Most common heat related disorder
  – Systemic reaction to prolonged heat exposure
HEAT EXHAUSTION

• Cause:
  – Results from cardiac output that is insufficient to support the increased circulatory load caused by
    • Competing blood flow
    • Reduced plasma volume
    • Sweat-induced depletion of salt and water
• Signs/Symptoms:
  – Frontal headache
  – Decreased urine output
  – Drowsiness
  – Nausea/Vomiting
  – Light-headedness
  – Fatigue
HEAT EXHAUSTION

• Signs/Symptoms (cont):
  – Anxiety
  – Irritability
  – Decreased coordination
  – Orthostatic hypotension
  – Moist, pale, clammy skin
  – Rectal temp usually below 104°F
HEAT EXHAUSTION

• Treatment:
  – Move to a cool location
  – Loosen or remove clothing
  – Assess vital signs
  – Oral rehydration preferred
  – Active cooling
  – Transport if patient is unconscious or does not recover rapidly
HEAT STROKE

• Definition:
  – A TRUE MEDICAL EMERGENCY
  – Can cause irreversible brain damage and death
HEAT STROKE

• Cause:
  – Impaired heat loss mechanisms
  – Total failure of the thermoregulatory mechanism causing excessive rise in body temperature
HEAT STROKE

• Signs/Symptoms:

  – Elevated core temperature of 104°F or greater
  – Mental status changes

    • Confusion
    • Disorientation
    • Combativeness
    • Unconsciousness
**Environmental Heat Injuries**

- **Classic Heatstroke**
  - Children, the elderly and sick patients
  - Dry, hot, red skin

- **Exertional Heatstroke**
  - Typically seen in men 15-45
    - Poor physical fitness
    - Lack of acclimatization
    - Involved in short-term, strenuous physical activity
    - Hot, humid environment
  - Sweat-soaked and pale skin at the time of collapse
HEAT STROKE

• Treatment
  – Primary goal is to reduce core temp
  – Remove patient from heat
  – Immediately begin cooling patient
    • Active cooling should stop when the rectal temp reaches 102.2°F
  – Maintain ABC’s
  – Monitor core temp every 5-10 minutes
• Treatment (cont)
  – Oral fluids if conscious
  – Unconscious Gain IV Access
    • 500 ml, no more than 1-2 liters
    • Vigorous fluid therapy may develop pulmonary edema
  – TACEVAC ASAP
METHODS OF COOLING THE BODY
MEHTODS OF BODY COOLING

• Immersion (Conduction):
  – Fastest method of cooling
  – Immerse patient in ice water
  – Not readily available in a field environment
  – Requires constant monitoring
MEHTODS OF BODY COOLING

• Direct Cooling
  – Apply ice packs on head, trunks and extremities
  – Place ice water towel/sheets over casualty
Room Temperature Water Misting

- Remove clothing and wet the pt down
- Fan the skin to cause evaporation and convective heat loss

Advantages
- Fast method
- Requires minimal monitoring
- No cold or ice water necessary
- Can treat multiple casualties at once
Preventive Measures
PREVENTIVE MEASURES

• Educate Personnel
  – Most important prevention measure

• Physical conditioning and health
  – Poor health and conditioning increases susceptibility
PREVENTIVE MEASURES

• Proper water intake
  – Drink liberal amounts of water (especially in hot weather)
  – Replace electrolytes by eating an adequate diet

• Proper acclimatization
  – 2 to 4 weeks (3 weeks optimal)
  – Gradual introduction to PT
• Proper clothing
  – Wear least amount possible
  – Avoid skin exposure to sunlight
  – Clothing should be loose fitting
  – NO STARCH of field uniforms

• Work Schedules
  – Tailor work schedules around the climate and type of work
Heat Condition
Flag Warning System
• Wet Bulb Globe Temperature (WBGT) index considers
  – Humidity
  – Air temperature
  – Radiant heat temperature
Color coded flag warning system:

- White
- Green
- Yellow
- Red
- Black

Flags should be displayed at all commands.
• White Flag:
  – WBGT 78 – 81.9° F
  – Caution must be taken
• Green Flag:
  – WBGT Index 82° - 84.9° F
  – Heavy exercise conducted with caution
Yellow Flag
- WBGT Index 85°-87.9° F
- Avoid strenuous exercise for unacclimatized troops
- Avoid classes in sun
• Red Flag:
  – WBGT Index 88°-89.9°F
  – Suspend PT for unacclimatized troops
  – Limited activity for acclimated troops
FLAG WARNING SYSTEM

• Black Flag
  – WBGT Index 90°F and above
  – Suspend ALL physical activity for ALL Troops
Easy Work
- Weapon Maintenance
- Walking Hard Surface at 2.5 mph, <30 lb Load
- Marksmanship Training
- Drill and Ceremony
- Manual of Arms

Moderate Work
- Walking Loose Sand at 2.5 mph, No Load
- Walking Hard Surface at 3.5 mph, <40 lb Load
- Calisthenics
- Patrolling
- Individual Movement Techniques, i.e., Low Crawl or High Crawl
- Defensive Position Construction

Hard Work
- Walking Hard Surface at 3.5 mph, ≥ 40 lb Load
- Walking Loose Sand at 2.5 mph with Load
- Field Assaults

---

<table>
<thead>
<tr>
<th>Heat Category</th>
<th>WBGT Index, °F</th>
<th>Work/Rest (min)</th>
<th>Water Intake (qt/hr)</th>
<th>Work/Rest (min)</th>
<th>Water Intake (qt/hr)</th>
<th>Work/Rest (min)</th>
<th>Water Intake (qt/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>78° - 81.9°</td>
<td>NL</td>
<td>½</td>
<td>NL</td>
<td>¾</td>
<td>40/20 min</td>
<td>¾</td>
</tr>
<tr>
<td>2 (GREEN)</td>
<td>82° - 84.9°</td>
<td>NL</td>
<td>½</td>
<td>50/10 min</td>
<td>¾</td>
<td>30/30 min</td>
<td>1</td>
</tr>
<tr>
<td>3 (YELLOW)</td>
<td>85° - 87.9°</td>
<td>NL</td>
<td>¾</td>
<td>40/20 min</td>
<td>¾</td>
<td>30/30 min</td>
<td>1</td>
</tr>
<tr>
<td>4 (RED)</td>
<td>88° - 89.9°</td>
<td>NL</td>
<td>¾</td>
<td>30/30 min</td>
<td>¾</td>
<td>20/40 min</td>
<td>1</td>
</tr>
<tr>
<td>5 (BLACK)</td>
<td>&gt;90°</td>
<td>50/10 min</td>
<td>1</td>
<td>20/40 min</td>
<td>1</td>
<td>10/50 min</td>
<td>1</td>
</tr>
</tbody>
</table>

- The work/rest times and fluid replacement volumes will sustain performance and hydration for at least 4 hrs of work in the specified heat category. Fluid needs can vary based on individual differences (± ¼ qt/hr) and exposure to full sun or full shade (± ¼ qt/hr).
- NL = no limit to work time per hr.
- Rest = minimal physical activity (sitting or standing) accomplished in shade if possible.
- CAUTION: Hourly fluid intake should not exceed 1½ qts. Daily fluid intake should not exceed 12 qts.
- If wearing body armor, add 5°F to WBGT index in humid climates.
- If doing Easy Work and wearing NBC (MOPP 4) clothing, add 10°F to WBGT index.
- If doing Moderate or Hard Work and wearing NBC (MOPP 4) clothing, add 20°F to WBGT index.
OVERVIEW

• Risk Factors
• Types of Cold Injuries
• Stages of Hypothermia
• Treatment of Hypothermia
• Preventive Measures
Please Read Your Terminal and Enabling Learning Objectives
BACKGROUND

- Hannibal lost over 20,000 men crossing the Alps
- Napoleon's retreat from Russia
- Trench foot during World War I
- 13,970 US deaths from 1978 - 1998 from hypothermia
BACKGROUND

• Cold injuries are:
  – Tissue injuries produced by exposure to cold
  – Dependent upon duration of exposure, humidity, wind, altitude, clothing, medical conditions, and individual behaviors
  – Can occur at nonfreezing and freezing temperatures
RISK FACTORS
RISK FACTORS

• Fatigue
  – Slow metabolic rate
  – Inability to increase activity
  – May cause apathy leading to neglect of cold weather protection principles
RISK FACTORS

• Age/Rank
  – Military personnel from 17-25 yrs of age
  – Front line troops who experience the most exposure
  – Higher ranks have more experience, less exposure and are receptive to training
RISK FACTORS

• Nutrition
  – Poor nutrition or incomplete meals contribute to cold injuries
  – Eat a well balanced diet
RISK FACTORS

• Discipline/Training/Experience
  – Well disciplined/trained personnel are better able to care for themselves:
    • Personal hygiene
    • Care of feet
    • Changing clothes
    • Practicing protection principles
RISK FACTORS

• Race/Geographic origin
  – Dark skinned individuals are more susceptible to cold related injuries
    • Greater susceptibility of pigmented cells to freeze compared to non-pigmented cells
  – Personnel from warmer regions are also more susceptible
RISK FACTORS

• Dehydration
  – Occurs easily in cold environments with increased activity
  – Proper fluid hydration is necessary

Even when its snowing, sleetling or cold!!
RISK FACTORS

• Medication

  – Avoid medications that cause vasoconstriction, increase urinary output or produce sweating
    • Antihistamines, decongestants
    • Diuretics
    • Psychiatric drugs, BP meds
RISK FACTORS

• Tobacco/Caffeine
  – Can cause vasoconstriction and poor circulation

• Alcohol
  – Vasodilator
  – Anesthetic properties cause subjects to not feel the cold
RISK FACTORS

• Environmental Factors
  – Weather
  – Temperature
  – Humidity
  – Precipitation
  – Wind
RISK FACTORS

NWS Windchill Chart

Temperature (°F)

Wind Chill (°F) = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})

Where, T = Air Temperature (°F)  V = Wind Speed (mph)

Effective 11/01/01
RISK FACTORS

• Activity

  – Over activity increases heat loss through rapid deep breathing and perspiration

  – Immobility causes decreased heat production
TYPES OF COLD INJURIES
CHILBLAINS (PERNIO)

- Small, itchy skin lesions
- Appear as red or purple bumps
- Occur on exposed skin surface from chronic cold exposure
CHILBLAINS

- Caused when cold constricts the small blood vessels
- Re-warming results in the leakage of blood and fluid in the surrounding tissues
CHILBLAINS

• Symptoms:
  – Usually occur several hours after exposure
  – Appear as nodular plaques
  – Intense pruritus
  – Burning paresthesia
CHILBLAINS

• Treatment:
  – Supportive in nature
  – Gently re-warm
  – Wash and dry affected area
  – Apply a dry, soft sterile bandage
SNOW BLINDNESS

- Ultraviolet burns to the skin and eyes
- Caused from exposure to bright reflections
- Corneal burns can occur within an hour but do not become apparent for 6 - 12 hrs
SNOW BLINDNESS

• Signs / Symptoms:
  – Excessive tearing
  – Pain
  – Redness
  – Swollen eye lids
  – Photophobia
  – Blurred vision
  – Headache
  – Gritty sensation in the eyes
SNOW BLINDNESS

• Treatment:
  – Prevent further exposure (e.g. sunglasses) or patch affected eye
  – Oral analgesics
  – DO NOT use steroid medication on eyes
    • Corneal Ulcerations
    • Corneal Perforation
  – TACEVAC if needed
FROSTBITE

• Freezing of fluids in the skin and subcutaneous tissues
• Ice crystal form, expand and cause damage to surrounding tissue
• Affects hands, fingers, feet, toes and male genitalia
FROSTBITE

• Cause:
  – Exposure to temperatures below 28°F (-2°C)
  – Exposure time necessary to produce damage varies based on:
    • Wind velocity
    • Air temperature
FROSTBITE

- Classified by depth of injury and clinical presentation
- Many cases will not be known for 24-72 hours

First Degree Frostbite → Second Degree Frostbite → Third Degree Frostbite → Fourth Degree Frostbite
Environmental Cold Injuries

FROSTBITE

- **1st Degree:**
  - Epidermal, limited to brief contact
  - Skin appears white or yellowish
  - No blister or tissue loss
  - Thaws quickly, feels numb and appears red
  - Healing occurs in 7-10 days
FROSTBITE

• 2nd Degree
  – Involves all epidermis and superficial dermis
  – Tissue feels stiff but gives way to pressure
  – Blisters contain clear or milky fluid
  – Surrounded by erythema and edema
  – No permanent loss of tissue
  – Healing occurs in 3-4 weeks
FROSTBITE

• 3rd Degree
  – Involves epidermis and dermis
  – After thawing, skin will have blood blisters
  – Slow loss of skin
  – Healing is slow
• 4th Degree
  – Full thickness through dermis with muscle and bone involvement
  – No mobility, passive movement after thawing
  – No blister, but will see early signs of necrotic tissue
  – Auto amputation
FROSTBITE

• Treatment (Superficial Frostbite):
  – First and Second Degree
  – Place affected area against warm body surface
FROSTBITE

• Treatment (Deep Frostbite):

  Third and Fourth Degree
  – Move to warm shelter
  – Thaw in warm water if delayed transport
  – Cover with loose, dry sterile dressing
  – Separate fingers and toes with cotton
FROSTBITE

• Treatment (Deep Frostbite):
  – Provide pain meds as needed
  – Start IV (250ml bolus warm saline)
  – TACEVAC ASAP
• **DO NOT**:  
  – Re-warm if there is a possibility of re-freezing  
  – Drain blisters  
  – Use ointments  
  – Rub with snow  
  – Give alcohol or tobacco  
  – Allow casualty to walk on affected feet  
  – Use direct heat greater than 102°F
HYPOTHERMIA
HYPOTHERMIA

• Definition:
  – A systemic, non-freezing cold injury in which the body’s core temperature falls below 95°F
  – The body is unable to generate sufficient heat production
  – Inadequate clothing and physical exhaustion contribute to heat loss
  – Can occur in hot and cold climates
• Causes:
  – Prolonged exposure to cold and/or wet conditions
  – Inadequate protection/clothing
  – Dehydration and/or poor nutrition
  – Poor physical conditioning
  – Resuscitation with cold fluids
STAGES OF HYPOTHERMIA

• Mild Hypothermia
  – Core temp above 93°F to below 97°F
  – Casualty shivering
    • Body’s main mechanism to generate heat
  – Altered LOC
    • Confusion
    • Slurred speech
    • Altered gait
    • Clumsiness
• Mild Hypothermia (cont)

  – Body will attempt to generate heat by increasing

  • Heart rate
  • Blood pressure
  • Cardiac output

  – Respiratory rate increases
STAGES OF HYPOTHERMIA

• Moderate Hypothermia
  – Core temp between 86°F to 93°F
  – Patient may not complain of being cold
  – Shivering will be absent
  – LOC greatly diminished
  – Paradoxical undressing
  – Cardiac dysrhythmias
STAGES OF HYPOTHERMIA

• Severe Hypothermia
  – Core temp below 86°F
  – Unconscious
  – Does not respond to pain
  – Vital signs barely or non-detectable
TREATMENT OF HYPOTHERMIA
TREATMENT OF HYPOTHERMIA

• Treatment:

  A PATIENT IS NOT DEAD UNTIL THEY ARE WARM AND DEAD

  – Move casualty to warm shelter
  – Remove wet clothing
  – Loosen / remove constrictive clothing
TREATMENT OF HYPOTHERMIA

• Warm Casualty
  – Cover head and body with warm blankets
  – Inhalation of warmed oxygen if available
  – Warm water bath (100-108°F)
  – Hot, sweet drinks if conscious
• Treatment (cont)
  – Monitor vital signs
  – Monitor core temperatures
  – Warm IV solutions
  – TACEVAC
PREVENTIVE MEASURES
PREVENTIVE MEASURES

• EDUCATION
  – NUMBER ONE PREVENTIVE MEASURE
  – Prevention depends on education of troops and leaders

• ACTIVITY LEVELS
  – Maintain steady constant rate of work
  – Quick bursts of activity should be avoided
PREVENTIVE MEASURES

• BUDDY SYSTEM
  – Train troops to observe each other
  – Train troops how to re-warm each other
PREVENTIVE MEASURES

• The Marine Corps uses “COLD” as a standard acronym to describe cold weather protection principles.
PREVENTIVE MEASURES

• COLD

  – Keep clothing CLEAN

  • Oily and dirty clothing quickly loses its insulating effects
PREVENTIVE MEASURES

• COLD

  – Avoid OVERHEATING

  • Over dressing and overexertion can produce dehydrated personnel and wet clothing
PREVENTIVE MEASURES

• COLD
  – LAYER correctly
  • Clothes should be loose to trap air between layers, which produces the insulating effect necessary for survival in the cold
PREVENTIVE MEASURES

• COLD
  – Keep clothing DRY
    • If clothing becomes wet, so does the skin, which will promote cooling and frostbite.
    • Change wet clothing at the first opportunity
ENVIRONMENTAL COLD INJURIES
PERFORM CARE OF THE FEET
OVERVIEW

• Anatomy
• Common Types of Foot Disorders
• Preventive Measures
Please Read Your Terminal and Enabling Learning Objectives
ANATOMY OF THE FOOT
ANATOMY OF THE FOOT

- **Forefoot**
  - Five phalanges
  - Five metatarsals

- **Midfoot**
  - Three cuneiform bones
  - Cuboid bone
  - Navicular bone
• Hindfoot
  – Talus bone
  – Calcaneus bone
• Muscles
• Tendons
  – Achilles
• Joints
COMMON FOOT DISORDERS
BLISTERS

• Definition
  – Pocket of fluid under the skin

• Causes
  – Improperly conditioned feet
  – Heat/Moisture
  – Improperly fitting boots and or socks
  – Friction/Pressure
BLISTERS

• Signs and Symptoms
  – Fluid collection under the skin
  – Mild edema and erythema
  – Sloughing of tissue
  – Localized discomfort
TREATMENT OF BLISTERS

• Small Blisters
  – Clean area with soap and water
  – Monitor for signs and symptoms of infection
  – Apply protective moleskin if necessary to prevent irritation
LARGE (CLOSED) BLISTERS

- If Affecting Individual’s Gait:
  - Wash area with Betadine or alcohol
  - Drain near edge of blister
  - Apply gentle pressure to expel any fluid
  - Apply moleskin donut, with Tincture of Benzoin
  - DO NOT apply adhesive directly on blister
  - Use foot powder
  - Monitor for signs and symptoms of infection
TREATMENT OF LARGE (OPEN) BLISTERS

– Wash with Betadine or soap/water
– Remove loose skin
– Apply Tincture of Benzoin around site
– Moleskin donut with:
  • Topical antibiotic to wound
  • Place Telfa pad inside moleskin donut
  • 2nd layer of moleskin over entire area
– Monitor for signs of infection
BLISTER KIT

MOLESKIN
HOW TO APPLY MOLESKIN DONUT

- Apply Tincture of Benzoin to skin around blister
- DO NOT put adhesive directly on blister
- Cut hole in moleskin large enough to surround blister and place around blister
DEMONSTRATION
ATHLETE’S FOOT (TINEA PEDIS)

• Definition
  – Chronic fungal infection

• Cause
  – Hot humid weather, excessive sweating
  – Contact with contaminated footwear and floors
  – Poor hygiene
ATHLETE’S FOOT (TINEA PEDIS)

• Signs and Symptoms
  – Skin that is red, flakes, peels, cracks
  – Itching, burning, stinging between toes
  – Sore, purulent, weeping rash
ATHLETE’S FOOT (TINEA PEDIS)

• Treatment
  – Antifungal powder daily
  – Antifungal ointment at night
  – Treat for 1 week after clearing has occurred
  – Refer to M.O. if unresponsive to treatment
INGROWN TOE NAIL

• **Definition:**
  - Nail border or corner presses on surrounding tissue
  - Painful and often results in infection
  - Often affects big toe
INGROWN TOE NAIL

• Causes
  – Most common are improper trimming of the toenails and poor hygiene
  – Trauma
  – Improperly fitted footwear
  – Abnormal shaped nail plate
INGROWN TOENAIL

• Signs and Symptoms
  – Pain (along margin of toenail)
  – Localized edema
  – Infection
    • Drainage of pus or blood
INGROWN TOENAIL

- Treatment
  - Trim the corner to relieve pressure
  - Elevate end of nail
  - Surgically correct by partial or complete removal of nail (Under supervision of M.O.)
  - Consider antibiotics
CORN AND CALLUSES

• **Callus**
  – Thickening of the outer layer of skin in response to pressure or friction

• **Corn**
  – Similar to a callus, involves a discreet pressure spot typically over a bone
CORNs AND CALLUSES

• Causes
  – Tight fitting shoes
  – Deformed toes
  – Prolonged walking down slopes
CORNs AND CALLUSES

• Signs and Symptoms
  – Thickened, dry skin over prominent bones (corn)
  – Large patches of thick dry skin on friction areas (calluses)
  – Pain on direct pressure of corns
  – Skin breakdown, possible infection
CORNs AND CALLUSES

• Treatment
  – Debride excess skin
  – Apply padding
  – Fix cause of corns (Boots)
  – Refer to M.O. if extreme
BUNIONS

• Definition
  – A bone deformity that causes the tip of toe to turn towards the other toes

• Causes
  – Causes bulge to form at the 1st metatarsal head
  – May be hereditary
  – Poorly fitted/excessively worn shoes
BUNIONS

• Signs and Symptoms
  – Thickened lump at base of big toe
  – Erythema
  – Pain near first metatarsal head
  – Joint stiffness
BUNIONS

• Treatment
  – Comfortable, properly fitted shoes
  – Toe pad or corrective sock
  – NSAIDS
  – Orthotics
  – Surgery for severe cases
PLANTAR FASCIITIS

- **Definition:**
  - Inflammation of the connective tissue (fascia) on the sole of the foot
  - AKA heel spurs/ heel bursitis
PLANTAR FASCIITIS

• Cause
  – Overuse or sudden increase in training volume/intensity
  – Abnormal joint mechanics
  – Tightness of Achilles tendon
  – Shoes with poor cushioning
  – Abnormal foot anatomy
  – Obesity, excess weight
  – Improper shoes
  – Bio-mechanical problems (mal-alignment of the heel)
PLANTAR FASCIITIS

• Signs and Symptoms
  – Tenderness along medial fascia
  – Constant pain (worse in morning and after physical activity)
  – Tearing/pulling sensation
  – Altered gait
PLANTAR FASCIITIS

• Treatment
  – Stretching Exercises
  – RICE
  – NSAIDS
  – Orthotics
PLANTAR WARTS

• **Definition:**
  - Wart located on the sole of the foot
  - Can be single lesion or grouped together
  - Most often found on the ball of the foot and heel
PLANTAR WARTS

• Cause
  – Human Papilloma Virus (HPV)

• Signs and Symptoms
  – Tiny black dots in center
  – Tender to touch
PLANTAR WARTS

• Treatment
  – Shave down
  – Apply Salicylic Acid
  – Apply dressing to keep paste in place
  – Apply donut for comfort
  – Leave paste for 3 days
  – Repeat tx in 1 week
  – Refer to MO if needed
• **Definition:**
  - A non–freezing pedal tissue injury caused by prolong exposure to wet and cold conditions
  - Immersion foot is a more severe variant of trench foot
IMMERSION FOOT (Trench Foot)

• Cause
  – Prolonged Exposure to water 32°- 50°F (Usually takes an excess of 12 hours)
  – Condition can occur on the hands due to damp or cold gloves
  – Limited movement
• Signs / Symptoms (EARLY)
  – Initially foot is pale, mottled, numb, pulseless, & immobile
  – After re-warming, severe burning pain and sensation returns
IMMERSION FOOT (Trench Foot)

• Signs / Symptoms (LATE 2-7 days)
  – Hyperemic Limb (increased amount of blood flow)
  – Numbness
  – Edema
  – Ulceration
  – Gangrene
IMMERSION FOOT (Trench Foot)

**TREATMENT**

- Supportive
- Gentle re-warming
- Elevation
- Consider antibiotics
- Avoid wearing boots
- Do not drain blisters
- Refer to M.O.
- TACEVAC severe cases
METATARSAL STRESS FRACTURE

• Definition:
  – Incomplete break of the metatarsal bones
  – Often seen in week 4 of intensive training programs
  – 2nd or 3rd metatarsal bones are most commonly affected; “March Fracture”
METATARSAL STRESS FRACTURE

• Causes
  – Repetitive stress
  – Abnormal foot structure (flatfoot)
  – Increased levels of activity
  – Obesity
• Signs and Symptoms
  – Edema in dorsum (top) of foot
  – Tenderness at the top of the foot during and after exercise
METATARSAL STRESS FRACTURE

• Treatment
  – Treat as fracture
  – RICE
  – NSAIDS
  – Rest for 2 or 3 weeks until pain is gone
  – Slow return to activity (i.e. low impact exercises)
  – Refer to M.O.
PREVENTIVE MEASURES FOR FOOT DISORDERS
Improve the fitting of boots and socks are common causes of foot problems.

Bring orthotic inserts and/or socks with you to correctly fit new boots.
PREVENTIVE MEASURES

• Toe box should be roomy enough to wiggle toes
• Ball of your foot should rest on widest part of sole
• Forefoot not wider than boot
• ½ inch between end of longest toe and boot
PREVENTIVE MEASURES

• Proper Fitting Socks
  – No excess material
  – Use ½ size larger socks for outer layer (If using 2 pair)

NOTE: Using Insoles may help cushion feet as boots begin to wear and stretch.
PREVENTIVE MEASURES

Before Marches
- Educate
- Keep feet clean and dry
- Use foot powder
- Properly trim toenails
PREVENTIVE MEASURES

• During marches
  – Elevate feet at rest points
  – Massage the feet
  – Apply foot powder
  – Take care of blisters
  – Loosen laces
PREVENTIVE MEASURES

After Marches

- Early and immediate attention to pain sources
- Wash and dry feet
- Treat foot injuries
PREVENTIVE MEASURES

• If red, swollen, tender skin develops along the edges of the foot:
  – Aeration
  – Elevation
  – Rest
  – Wider foot wear
PERFORM CARE OF THE FEET
Water Video.wmv
OVERVIEW

• Water Sources and Characteristics
• Factors Affecting Sources of Water
• Procedures for Water Purification
• Water Testing
Please read your Terminal and Enabling Learning Objectives
BACKGROUND

• Safe water is essential

• Insufficient quantity or quality can affect operational readiness

• All personnel must be familiar with proper water discipline
WATER SOURCES AND CHARACTERISTICS

Atlantic Ocean

Pacific Ocean

Indian Ocean
SALT WATER

• SOURCES
  – Ocean, sea

• CHARACTERISTICS
  – Less contaminated
  – Unlimited supply
  – Best source of water if a ROWPU is available
GROUND WATER

• SOURCES
  – Wells & Springs

• CHARACTERISTICS
  – Best source of water during an NBC attack
  – Less chemical & biological pollution
  – Quantity is hard to determine
SURFACE WATER

• SOURCES
  – Rivers, lakes, ponds, streams

• CHARACTERISTICS
  – Larger sources less contaminated
  – Moving water is preferable
  – Easiest to procure for individual use
  – Readily accessible
RAIN WATER

- Not a reliable source
- May not provide an adequate supply
FACTORS AFFECTING SOURCES OF WATER
• Source should provide adequate for all troops
• Must last for the duration of operations
QUALITY

- Free of contamination from sewage, toxic elements and NBC agents
- Source protected from runoff from latrines, showers, motor pools, etc.
- Should be clear/colorless
• Water should not be objectionable due to taste and/or odors

• Remove turbidity to reduce contamination
  – Suspended particles often contain organisms that cause disease
  – Particles decrease effectiveness of chlorine
QUALITY

• Temperature
  – Warm water is not palatable
  – Consumption rate decreases as water gets warmer
  – Cool water retains chlorine longer
ACCESSIBILITY

- Must be easily ACCESSIBLE to water purification and transport equipment
PROCEDURES FOR WATER PURIFICATION
TYPES OF CONTAINERS

• Canteen
  – Individual use
  – 1 qt

• Jerry Can
  – 5 gallon container
  – Must be labeled
    "POTABLE WATER ONLY"
TYPES OF CONTAINERS

• Lyster Bag
  – 36 gallon capacity
  – Used for hand washing stations
TYPES OF CONTAINERS

• Water Bull
  – 400 gallon capacity
  – Mobile potable water
  – Easily accessible
IODINE TABLETS

• Inspect tablets for signs of deterioration

• Should be solid and steel gray in color

• Tablets that are yellow or brown, that stick together or crumble easily are no longer effective
IODINE TABLETS

• Purifying water in canteens:
  – Fill canteen with cleanest water possible
  – Add two iodine tablets to 1 quart canteen
  – If using tincture of iodine, five drops are equal to one tablet
  – Replace cap and shake to dissolve tablet
  – Wait 5 min, loosen cap and allow leakage around the threads
  – Tighten cap and wait an additional 25 min before drinking
IODINE TABLETS

• Purifying water in hydration systems
  – Fill hydration system with cleanest water possible
  – Use four tablets for 70-72 oz system
  – Use six for 100-102 oz system
  – Allow 30 min total contact time
• Add two drops of bleach per quart for canteens
• Use four drops for 70 oz reservoir
• Use six drops for 100 oz reservoir
• Let stand for 30 min before drinking
MICROPUR

- Purifying water in canteens:
  - Fill canteen with cleanest water possible
  - Add one tablet to 1 quart canteen
  - Replace cap and shake to dissolve tablet
  - Wait 5 min, loosen cap and allow leakage around the threads
  - Allow 30 min contact time before consuming water, 4 hours for cold or cloudy water
MICROPUR

• Purifying water in hydration systems:
  – Fill hydration system with cleanest water possible
  – Use two tablets for 70-72 oz system
  – Use three for 100-102 oz system
  – Allow 30 min contact time before consuming water, 4 hours for cold or cloudy water
BOILING WATER

• Used in emergency situations for small amounts of water

• Vigorously boil water for 5 minutes

• Does not provide for residual disinfectant capabilities

• Not to be used to store large quantities of water
PROCEDURES FOR WATER TESTING
TESTING OF WATER

- All bulk water supplied for drinking must be tested daily for FAC
- Perform weekly bacteriological testing
WATER TESTING

• Procedure for water testing
  – Fill sample test tube to line
  – Add (1) DPD #1 tablet, place cap on tube
  – Agitate until tablet is completely dissolved
  – Compare color of water to comparator
TESTING OF WATER

• Range should be between –2.0 and 5.0 ppm
WATER PURIFICATION
FIELD WASTE DISPOSAL
OVERVIEW

- Types of Waste
- Guidelines for Latrine Placement
- Devices Used for Human Waste
- Devices Used for Liquid Waste
- Garbage and Rubbish Disposal
- Guidelines for Garbage Pit Placement
Please Read Your

Terminal Learning Objectives

And

Enabling Learning Objectives
WASTE

• All types of liquid and solid material excreted from the body as useless or unnecessary as a result of living activities of humans or animals.
  – Human
  – Liquid
  – Garbage
  – Rubbish
TYPES OF WASTE

• HUMAN WASTE
  – Feces
  – Urine
  – Blood / body fluids

• LIQUID WASTE
  – Bath water
  – Liquid kitchen waste
TYPES OF WASTE

• GARBAGE
  – Organic materials from food service operations

• RUBBISH
  – Boxes
  – Cans
  – Paper
  – Plastic
GUIDELINES FOR LATRINE PLACEMENT
LATRINE PLACEMENT

• DISTANCE
  – At least 100 feet from water sources
  – At least 100 yards (300 ft) from food operations
  – 50 feet from berthing areas
FIELD SANITATION DEVICES FOR HUMAN WASTE DISPOSAL
FIELD SANITATION DEVICES

• CATHOLE
  – Used on the move
  – Use E-Tool
  12” diam. x 12” deep
  – Cover immediately after use
• STRADDLE TRENCH
  – Temporary bivouac of (1 to 3 days)
  – (4) trenches per (100) troops
  – Construction
    • 1 ft wide x 2 ½ ft deep x 4 ft long
    • Use wood planks on each side
    • Forked stick with coffee can to cover toilet paper
FIELD SANITATION DEVICES

• BURN BARREL LATRINE
  – MOST COMMON latrine used in the field
  – Used in area of high water tables
  – (8) seats required per 100 troops
  – Place sign on door: DO NOT URINATE
  – Built as (2) or (4) seats over 55 gal. drum cut in half
BURN BARREL LATRINE

- Operation
- Prime drums with 3" of diesel
- Burn cans daily
  - 4 parts diesel to 1 part gas
- Clean, disinfect and check screens daily
- Bury ash of burnt fecal matter
1. FORWARD EDGE OF HOLE SHOULD BE WELL BACK FROM THE EDGE OF THE BENCH (4-6").
2. TOP RIM OF BARREL SHOULD BE NO MORE THAN 2" FROM UNDERSIDE OF SEAT. (MORE THAN 2" WILL RESULT IN SPLASHING AND SPILLAGE INTO COMPARTMENT.)
3. THE BARREL SHOULD BE PUSHED ALL THE WAY BACK AGAINST THE BACK STOP WHICH HELPS TO CENTER CAN UNDER HOLE.
4. RUNNERS AID TO CENTER BARREL UNDER HOLE TO PREVENT SPILLAGE.

Figure 9-10.
BURN BARREL LATRINES with HAND WASHING STATION

Note:
Poor Screening
No Doors
The WAG BAG® WASTE KIT includes:

- 1 Degradable waste bag with gelling agent, odor neutralizer, and decay catalyst
- 1 Degradable zip-close disposal bag
- Toilet paper and hand sanitizer

Instructions with the PETT® toilet:

1. Open kit and place bottom of waste bag into zip-close bag.
2. Place both bags into the black net.
3. Spread top of waste bag over the seat.
4. Open positioned waste bag wide for capacity.
5. After use, fold waste bag into zip-close bag and zip closed.
6. Discard into trash receptacle for disposal.

DO NOT INGEST POWDER IN WAG BAG WASTE KIT. IF POWDER GETS IN EYES, FLUSH WITH WATER. TO AVOID RISK OF SUICIDATION, KEEP PLASTIC BAGS AWAY FROM CHILDREN AND PETS.

Please protect our environment—always dispose of properly.
URINE DISPOSAL DEVICES

• Temporary latrine used in sandy soils.
  – One pipe can accommodate 20 men.
  – Pit: 4’ x 4’ x 4’
  – Fill with large rocks, flattened cans, bottles, rubble
  – Insert six 1” diam. 36” long pipes at an angle with 8” of pipe below surface
  – Ventilation shaft at each end of pit, 6-12 inches above ground
  – Cover ends of each tube with a funnel and mesh material
URINE DISPOSAL DEVICES
URINE DISPOSAL DEVICES
OTHER TYPES OF LATRINES

• CHEMICAL TOILETS
  – Maintained by contracted services
  – Commonly used in garrison or training
  – One toilet can service up to 15 personnel
LIQUID WASTE DISPOSAL DEVICES
LIQUID WASTE DEVICES

• **SOAKAGE PIT (4’ x 4’ x 4’)**
  – Built the same as Urine Soakage Pits (without tubes)
  – 1 pit can accommodate 200 men
LIQUID WASTE DEVICES

SOAKAGE PITS

Kandahar Airport
LIQUID WASTE DEVICES

• EVAPORATION BEDS
  – Used to dispose of kitchen waste or bathing waste when Soakage pits are impractical
  – Used in hot, dry climates where ground is too hard to dig pits
GARBAGE DISPOSAL DEVICES
GARBAGE DISPOSAL DEVICES

• Garbage Pit: (4’ x 4’ x 4’)
  – Preferred method of garbage disposal for overnight stay
  – Suitable for 100 troops for 1 day

• Garbage Trench: (2’w x 4’d)
  – Adaptable for 2 or more days
  – Continuous trench can be dug
Garbage / Trash PIT

(Kandahar Airport)
RUBBISH DISPOSAL DEVICES

• Garbage Pit: For short stays. Rubbish is buried with the garbage.

• INCINERATION DEVICES
  – Barrel incinerator
GARBAGE PIT PLACEMENT

• DISTANCE
  – At least 100 FEET from mess area
  – At least 100 FEET from water source

• INCINERATORS
  – At least 50 YARDS downwind from camp
FIELD WASTE DISPOSAL
ENVENOMATION INJURIES
• Definitions
• Types of Venomous Snakes
• Treatment of Snake Bites
• Management of Arthropod Envenomation
• Anaphylactic Shock
LEARNING OBJECTIVES

Please Read Your Terminal Learning Objectives And Enabling Learning Objectives
DEFINITIONS

• Envenomation
  – An injury of illness caused by the poisonous secretion of an animal, usually transmitted by a bite or sting.
ACTIONS OF SNAKE VENOM

• Hemotoxin:
  – Destroy red blood cells, disrupts blood clotting, and cause organ degeneration and tissue damage.

• Neurotoxin:
  - Acts on nerve cells and tissue, and disrupts brain function.

• Cytotoxin: Typically attacks only a specific type of cell, muscle group, or organ.
SNAKE VENOM:

• Affects the body in a number of ways depending on:
  - Type and quantity of venom

• Different snake species produce different types of venom.
CROTALINAE (PIT VIPERS)

- Venom: Hemotoxin
- Characteristics:
  - Retractable fangs
  - Heat sensing pit
  - Large triangular head
  - Slit-like pupils
CROTALINAE (PIT VIPERS)

- Examples:
  - Rattlesnakes
  - Moccasins
  - Copperheads
  - Saw-Scaled viper
  - Habu

Eastern Diamondback Rattlesnake
COTTONMOUTH (WATER MOCCASIN)

CROTALINAE (PIT VIPERS)

SAW SCALED VIPER
CROTALINAE (PIT VIPERS)

• Signs and Symptoms:
  – Excruciating pain at bite site
  – Tissue swelling at bite site
  – Bleeding from major organs (hematuria)
  – Tingling or numbness
  – Headache
  – Nausea / vomiting
  – Death may occur within 6-48 hours
COLUBRINAE

• Characteristics:
  – Venom is hemotoxic
  – Fixed fangs in rear of mouth
  – Egg shaped head
  – Large eyes
• Signs and Symptoms:
  – Symptoms may not manifest until hours after bite.
  – Hemorrhage to gums, nose and other orifices
  – Headache / nausea
  – Blood in stool, urine, or saliva
  – Death due to internal bleeding
BOOMSLANG

COLUBRINAE
ELAPINAE

• Characteristics:
  – Venom is neurotoxic
  – Front fixed hollow fangs
  – Round pupils
  – Head shape is in proportion to the width of body
• Signs and Symptoms:
  – Stiffness, muscle aches, spasms
  – Severe headache, blurred vision, and drowsiness
  – Pain at bite site
  – Nausea, vomiting, and diarrhea
  – Chills with rapid onset of fever
  – Respiratory paralysis and death
ELAPINAE (CORAL SNAKES)

- EXAMPLES: Coral Snakes, Cobra, Krait

(red on black, red on yellow, and other patterns)

Tropical Coral Snake

Eastern Coral Snake
ELAPINAE

KRAIT

COBRA
HYDROPHIINAE (SEA SNAKES)

- Characteristics:
  - Neurotoxic venom
  - Fixed fangs
  - Flat tail
  - Brightly colored
HYDROPHIINAE (SEA SNAKES)

• Signs and Symptoms:
  • Bites are usually painless
  • Little or no swelling
  • Most important early symptoms are of rhabdomyolysis
    • Headache
    • Thick-feeling tongue
    • Thirst
    • Sweating
    • Vomiting
Symptoms that can occur after 30 minutes to several hours post-bite include:

- Generalized aching
- Stiffness and tenderness of muscles all over the body
- Paralysis of voluntary muscles
  - Paralysis of muscles involved in swallowing and respiration can be fatal

After 6 to 12 hours the result of muscle breakdown can lead to cardiac arrest.
TREATMENT OF A SNAKE BITE

• **Diagnosing a snake bite:**
  • Fang marks
  • Bleeding, small lacerations
  • Presence of fang marks does not always indicate envenomation
  • Manifestation of signs and symptoms of envenomation are necessary to confirm diagnosis of a snake venom poisoning.
TREATMENT OF A SNAKE BITE
TREATMENT

• Most definitive care is:

ANTIVENOM
TREATMENT OF SNAKEBITE

• Keep victim calm and reassured
• Allow limb to rest at a neutral position in relation to heart
• Locate bite site, removing any rings or constricting items from extremity
TREATMENT OF SNAKEBITE

- If on extremity, place constricting band above and below the bite.
- On hand or foot, single band above wrist or ankle.
- Apply splint
- Check distal pulses
- Monitor and TACEVAC
COMMON DON’TS

- DO NOT cut or incise the bite site
- DO NOT apply ice or heat
- DO NOT apply oral suction
- DO NOT remove any dressings/bandages
- DO NOT try to kill the snake for identification
- DO NOT have the victim eat or drink anything
PREVENTION OF SNAKE BITES

• LEAVE THE SNAKE ALONE    !!!!!!

• Keep your hands and feet out of areas you can’t see.
ARTHROPOD ENVENOMATION
• Reaction to sting from histamine response
• Honey bees sting once and leave stingers in skin
• Wasps, bumble bees, and hornets can sting multiple times
BEES AND WASPS

Signs and Symptoms

• Pain
• Itching/burning sensation
• Wheal
• Be aware for anaphylactic shock
INSECT STING TREATMENT

• Immediately remove stinger
  – DO NOT USE TWEEZERS
  – Scrap across skin with card or knife blade

• Apply ice

• Hydrocortisone 1% BID

• Monitor for Anaphalaxis
• Some species of ants can bite repeatedly, while some have stingers at the tip of their abdomen.

• Signs and Symptoms:
  – Pain
  – Itching/burning
  – Vesicles
  – Monitor for anaphylactic reaction
ANTS

• Multiple bites can cause more severe reactions
  – Vomiting
  – Diarrhea
  – Edema
  – Hypotension due to vasodilatation

• Treatment
  – Apply ice
  – Apply Hydrocortisone 1% BID
  – Monitor for Anaphylaxis
MILLIPEDES

• Secrete toxin as a defense mechanism

• Signs and Symptoms:
  – Dermatitis that begins with a brown stain on skin
  – Secretions in the eye can cause lacrimation and blurry vision
MILLIPEDES

• Treatment:
  – Wash skin with soap and water
  – If toxin is secreted in the eyes, irrigate with water or saline; an ophthalmologic evaluation is mandatory
  – Monitor for anaphylaxis
CENTIPEDES

• Signs and Symptoms:
  – Burning pain, tenderness
  – Erythema (redness)
  – Local swelling
  – Superficial necrosis and ulceration may sometimes occur
• Treatment:
  – NSAIDS
  – Lidocaine or other anesthetic
  – Look for anaphylactic reaction
CATERPILLARS

• Venomous caterpillars have venom in hollow hairs all over their bodies

• Signs and Symptoms:
  – Dermatitis
  – Erythema and edema
  – Conjunctivitis
  – Necrosis

Saddle back caterpillar
Treatment:

- Use scotch tape to remove hairs from skin
- Do not rub area
- Monitor for anaphylaxis
BLACK WIDOW SPIDER

Venom is Neurotoxic

Red "Hourglass" shape on abdomen
BLACK WIDOW

• Signs and Symptoms:
  – Initial pain is not severe, but severe local pain rapidly develops
  – Pain gradually spreads over the entire body and settles in the abdomen and legs
  – Weakness
  – Sweating
  – Excessive salivation
  – Rash may occur
• Signs and Symptoms (cont):
  – Tremors
  – Nausea/vomiting
  – Respiratory muscle weakness combined with pain may lead to respiratory arrest
  – Anaphylactic reactions can occur but are rare
  – Symptoms usually regress after several hours and are usually gone in a few days
BLACK WIDOW

• Treatment:
  – Clean with soap and water
  – Intermittent ice for 30 minutes each hour
  – Antibiotics if infection occurs
BROWN RECLUSE

- Small body
- Light brown
- Dark brown violin shape on posterior thorax
- Venom is hemotoxic / cytotoxic
BROWN RECLUSE

• Signs & Symptoms:
  – Painless bite
  – Painful red area with cyanotic center develops within few hours
  – Tissue damage is possible
Area of discoloration that does not blanch after several days.
BROWN RECLUSE

• Signs & Symptoms:
  – After 1-2 weeks
    • Area turns DARK and scab falls off leaving ulcer
  – Ulcer may persist for weeks to months
  – Systemic reaction may occur that could lead to death
• Treatment:
  – Cold compresses
  – Provide supportive care
  – Refer to Medical Officer
  – Tetanus prophylaxis and antibiotics
  – Monitor for anaphylaxis
SCORPIONS

• Predatory arthropods that have eight legs, a pair of grasping claws and a narrow segmented tail ending with a venomous stinger.

• Scorpions range in size and are found widely distributed over all continents.

• Scorpion venom has a fearsome reputation and about 25 species are known to have venom capable of killing a human being.

• Venom is neurotoxic
SCORPION STING

• Signs and Symptoms:
  – Erythema and edema
  – Pain and/or paresthesia
  – Cranial nerve dysfunction
  – Somatic skeletal neuromuscular dysfunction
Treatment:

- Based on level of envenomation
  - Ice
  - Oral analgesics
  - Monitor for anaphylaxis
PREVENTION OF ARTHROPOD ENVENOMATION

- LEAVE THEM ALONE
- Avoid nesting sites and hives
- Personnel with known allergies should carry an Epi-pen or Ana-kit
- Shake out sleeping bags and clothing
- Check boots
- Wear shoes
- Wear gloves
- Remove rubbish and wood from camp
- Fill in cracks and recesses
ANAPHYLACTIC SHOCK

• Life threatening reaction to an allergen
• May have a rapid and severe onset
• May be caused by:
  Injections
  Stings
  Ingestion
  Inhalation
  Absorption
ANAPHYLACTIC SHOCK

• Signs and Symptoms:
  – will progressively get worse
  – Itching, redness, hives
  – Respiratory depression
  – Sense of fullness in throat
  – Anxiety, SOB, lightheadedness
  – Decreased LOC

The faster the onset of symptoms, the more severe the reaction!
ANAPHYLACTIC SHOCK

• Treatment:
  – Maintain ABC’s
  – Benadryl
  – Epinephrine
  – Fluid resuscitation
  – Documentation of medicines given
  – TACEVAC
ENVENOMATION INJURIES