

COLD INJURIES: DESCRIPTION, TREATMENT AND PREVENTION

**Presenter's Name
Presenter's Command
Local Contact Information**

Prepared by:
U.S. Army Center for Health Promotion and Preventive Medicine
(800) 222-9698/ DSN 584-2464/(410) 436-2464
<http://usachppm.apgea.army.mil>

Introduction

Prevention of cold injuries is a Command
and Individual Responsibility

**ALL COLD WEATHER INJURIES ARE
PREVENTABLE!!!**

Outline

- Susceptibility Factors
- Cold Weather Injuries
 - description
 - treatment
 - prevention
- Conclusion

Regulation of Body's Temp

- Body's heat production

- metabolism
- exercise
- shivering

- Heat loss

- convection
- conduction
- radiation
- respiration
- evaporation

Typical Victim of a Cold Weather Injury

- Male
- E-4 or below
- Approximately 20 years old
- From a warm climate
- Less than 18 months time in service
- Uses tobacco, alcohol or medications
- Neglects proper foot care

Susceptibility Factors

- Previous cold weather injury
- Inadequate nutrition
- Alcohol, nicotine use
- Dehydration
- Overactivity (sweating)
- Underactivity
- Long exposure to the cold
- Sick or injured
- Acclimatization
- Ethnic/geographic origin
- Wind, cold, rain
- Age
- Discipline and morale
- Physical stamina
- Inadequate training
- Poor clothing and equip

Types of Cold Injuries

- Hypothermia
- Frostbite
- Chilblains
- Immersion/Trench Foot
- Dehydration
- Carbon Monoxide Poisoning
- Snow Blindness
- Sunburn

Hypothermia

- MEDICAL EMERGENCY; life threatening condition
- Severe body heat loss-body temp falls below 95°F
- Occurs when:
 - conditions are windy, clothing is wet, and/or the individual is inactive
 - extended water exposure or immersion
 - 1 hour or less when water temp is below 45°F
 - prolonged exposure in slightly cool water (e.g. 60°F)
 - thunderstorms, hail, rain and accompanying winds

Hypothermia

The “umbles”-stumbles, mumbles, fumbles, and grumbles

● Initial Symptoms

- shivering
- dizzy, drowsy
- withdrawn behavior
- irritability
- confusion
- slowed, slurred speech
- altered vision
- stumbling

● Severe Stages

- stops shivering
- desire to lie down and sleep
- heartbeat and breathing is faint or undetectable
- unconsciousness followed by DEATH

Hypothermia

- Treatment

- prevent further cold exposure
- evacuate immediately if severe hypothermia
- remove wet clothing
- rewarm in a warmed sleeping bag
- warm, sweet liquids if conscious
- minimize handling of the unconscious victim so as to not induce a heart attack.

Hypothermia

● Prevention

- eat properly and often
- warm liquids and water
- wear uniform properly (layers worn loosely)
- keep active
- stay dry
- warming tents
- get plenty of rest
- buddy watch/observation/NCO checks

| BODY TEMP | SYMPTOMS | OBSERVABLE IN OTHERS | FELT BY YOURSELF |
|---|---|---|--|
| (Early Stage) 98.6 ⇒ 95.0 | Intense and uncontrollable shivering; ability to perform complex tasks impaired | Slowing of pace. Intense shivering. Poor coordination. | Fatigue. Uncontrollable fits of shivering. Immobile, fumbling hands. |
| (Moderate Stage) 95.0 ⇒ 91.4 | Violent shivering persists, difficulty in speaking, sluggish thinking, amnesia begins to appear. | Stumbling, lurching gait. Thickness of speech. Poor judgment. | Stumbling. Poor articulation. Feeling of deep cold or numbness. |
| (Severe Stages) 91.4 ⇒ 87.8 | Shivering decreases; replaced by muscular rigidity and erratic, jerky movements; thinking not clear but maintains posture. | Irrationality, incoherence. Memory lapses, amnesia. Hallucinations. Loss of contact with environment. | Disorientation. Decrease in shivering. Stiffening of muscles. Exhaustion, inability to get up after a rest. |
| 87.8 ⇒ 85.2 | Victim becomes irrational, loses contact with environment, drifts into stupor; muscular rigidity continues; pulse and respiration slowed. | Blueness of skin. Decreased heart and respiratory rate. Dilation of pupils. Weak or irregular pulse. Stupor. | Blueness of skin. Slow, irregular, or weak pulse. Drowsiness. |
| 85.2 ⇒ 78.8 | Unconsciousness; does not respond to spoken work; most reflexes cease to function; heartbeat becomes erratic. | Unconsciousness. | |
| 78.8 ↓ | Failure of cardiac and respiratory control centers in brain; cardiac fibrillation; probable edema and hemorrhage in lungs; apparent death. | | |

Frostbite

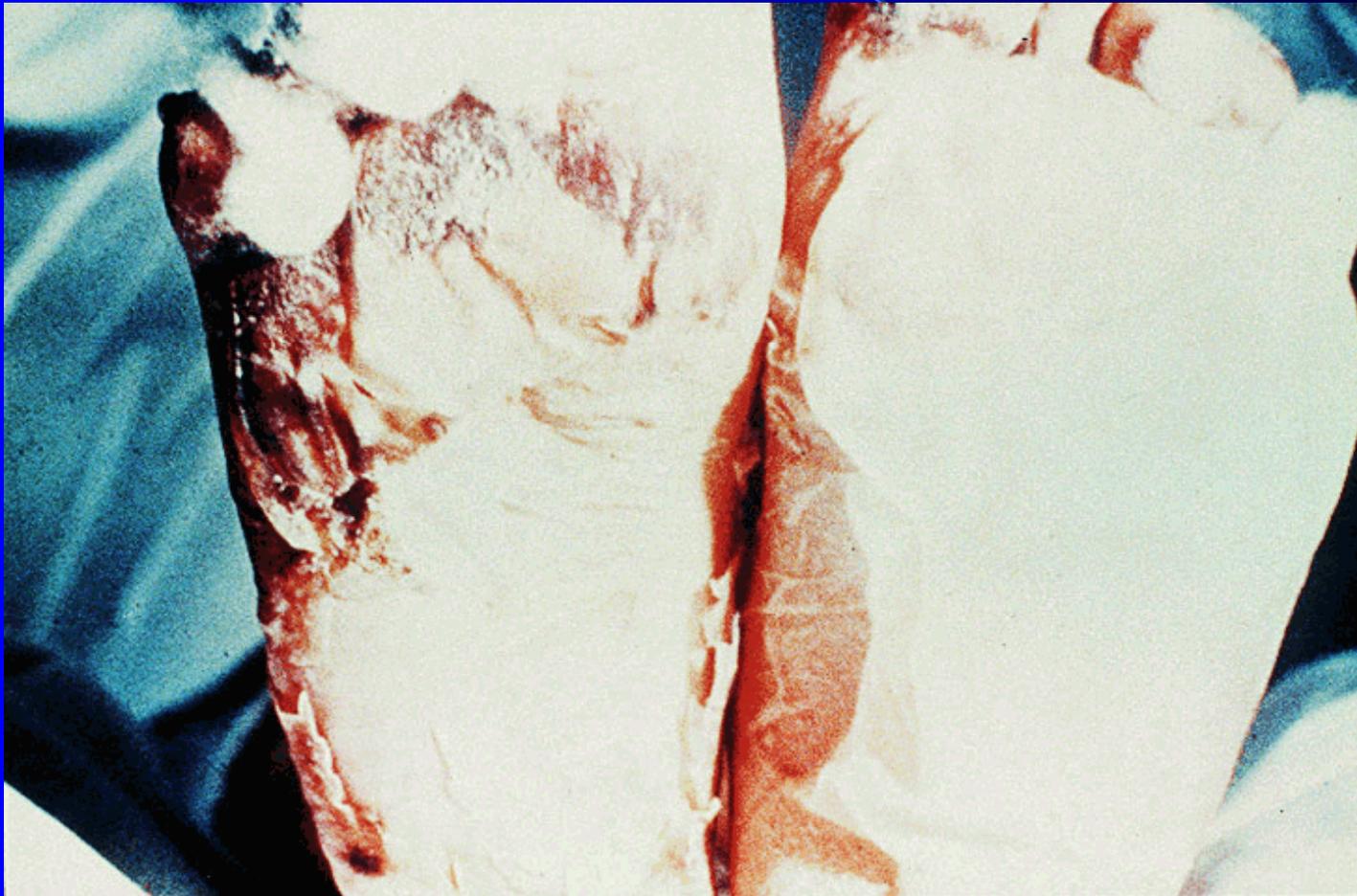
- Air temps below 32°F
 - skin freezes at 28°F
- Superficial frostbite (mild)
 - freezing of skin surface
- Deep frostbite (severe)
 - freezing of skin and flesh, may include bone
- Hands, fingers, feet, toes, ears, chin, nose, groin area

Frostbite

- Symptoms

- initially redness in light skin or grayish in dark skin
- tingling, stinging sensation
- turns numb, yellowish, waxy or gray color
- feels cold, stiff, woody
- blisters may develop

Deep Frostbite



Frostbite

- Treatment

- remove from cold and prevent further heat loss
- remove constricting clothing and jewelry
- rewarm affected area evenly with body heat until pain returns
 - when skin thaws it hurts!!
 - do not rewarm a frostbite injury if it could refreeze during evacuation or if victim must walk for medical treatment
- do not massage affected parts or rub with snow
- evacuate for medical treatment

Frostbite



Frostbite

● Prevention

- wear uniform properly (layers and loosely)
- keep socks and clothing dry (use poly pro/thermax liner socks and foot powder/ change insoles also)
- protect yourself from wind
- keep face and ears covered and dry
- drink hot fluids and eat often
- keep active
- insulate yourself from the ground (sleeping pad/tree branches etc...)
- “Buddy System”
- caution skin contact with super-cooled metals or fuel
- Use approved gloves to handle POL
- seek medical aid for all suspected cases

Chilblains

- Nonfreezing cold injury
- Cold, wet conditions (between 32-60°F, high humidity)
- Repeated, prolonged exposure of bare skin
- Can develop in only a few hours
- Ears, nose, cheeks, hands and feet

Chilblains

- Symptoms:
 - initially pale and colorless
 - worsens to achy, prickly sensation then numbness
 - red, swollen, hot, itchy, tender skin upon rewarming
 - blistering in severe cases

Chilblains

- Treatment

- prevent further exposure
- wash, dry gently
- rewarm (apply body heat)
- don't massage or rub
- dry sterile dressing
- seek medical aid

Chilblains

- Prevention
 - keep dry and warm
 - cover exposed skin
 - wear uniform properly
 - use the “Buddy System”

Trench/Immersion Foot

- Potentially crippling, nonfreezing injury (temps from 50°F-32°F)
- Prolonged exposure of skin to moisture (12 or more hours)
- High risk during wet weather, in wet areas, or sweat accumulated in boots or gloves

Trench/Immersion Foot

- Symptoms

- initially appears wet, soggy, white, shriveled
- sensations of pins and needles, tingling, numbness, and then pain
- skin discoloration - red, bluish, or black
- becomes cold, swollen, and waxy appearance
- may develop blisters, open weeping or bleeding
- in extreme cases, flesh dies

Trench/Immersion Foot



Trench/Immersion Foot

- Treatment
 - prevent further exposure
 - dry carefully
 - DO NOT break blisters, apply lotions, massage, expose to heat, or allow to walk on injury
 - rewarm by exposing to warm air
 - clean and wrap loosely
 - elevate feet to reduce swelling
 - evacuate for medical treatment

Trench/Immersion Foot

- Prevention

- keep feet clean and dry
- change socks at least every 8 hours or whenever wet and apply foot powder
- bring extra boots to field - alternate boots from day to day to allow boots to dry.
- no blousing bands
- report all suspected cases to leadership

Dehydration

- A loss of body fluids to the point of slowing or preventing normal body functions
- Increases chance of becoming a cold weather casualty (especially hypothermia)

Dehydration

- Symptoms

- dark urine
- headache
- dizziness, nausea
- weakness
- dry mouth, tongue, throat, lips
- lack of appetite
- stomach cramps or vomiting
- irritability
- decreased amount of urine being produced
- mental sluggishness
- increased or rapid heartbeat
- lethargic
- unconsciousness

Dehydration

- Treatment

- drink WATER or other warm liquids
- water should be sipped, not gulped
- do not eat snow
- Rest
- get medical treatment

Dehydration

- Prevention

- drink minimum of 3 canteens of water daily for inactivity and 5-6 quarts for activity
- monitor urine color
- do not wait until you are thirsty
- drink hot liquids for warmth

Carbon Monoxide Poisoning

- When oxygen in the body is replaced by carbon monoxide
 - colorless, odorless, tasteless gas resulting from incomplete combustion
- Inadequate ventilation from engines, stoves, heaters



Carbon Monoxide Poisoning

- Symptoms

- headache
- dizziness
- weakness
- excessive yawning
- ringing in ears
- confusion
- nausea
- bright red lips, eyelids
- grayish tint in dark-skinned people
- drowsiness
- unconsciousness
- possibly death

Carbon Monoxide Poisoning

- Treatment

- move to fresh air immediately
- seek medical aid promptly
- provide mouth-to-mouth resuscitation if victim is not breathing

Carbon Monoxide Poisoning

- Prevention

- ensure proper ventilation
- don't use unvented heaters or engines
- ensure heaters are regularly serviced
- turn heaters off when not needed (during sleep)
- if heater kept on during sleep, post a fire guard
- never sleep in vehicle with engine running
- never wrap poncho around vehicle exhaust to collect heat

Snow Blindness

- Inflammation and sensitivity of the eyes caused by ultraviolet rays of the sun reflected by the snow or ice
- Symptoms
 - gritty feeling in eyes
 - redness and tearing
 - eye movement will cause pain
 - headache

Snow Blindness

● Treatment

- remove from sunlight
- blindfold both eyes or cover with cool, wet bandages
- seek medical attention
- recovery may take 2-3 days

● Prevention

- eye protection
 - dark, UV protective glasses
 - field expedient-cut narrow slits in MRE cardboard and tie around head
- do not wait for discomfort to begin

Sunburn

- Burning of the skin due to overexposure to the sun and UV light
- Contributing factors
 - fair skin, light hair
 - exposed skin
 - reflective qualities of the snow
 - high altitudes
- Symptoms
 - redness of skin, slight swelling (1st deg)
 - prolonged exposure (2nd deg)
 - pain and blistering
 - chills, fever, headache

Sunburn

● Treatment

- soothing skin creams in mild cases
- in severe cases, seek medical attention
- ibuprofen for pain

● Prevention

- cover exposed skin with clothing
- sunscreen, lip balm
- limit exposure of skin to the environment

Conclusion

- Dress properly
- Drink plenty of fluids
- Eat right
- Keep in shape
- Get plenty of rest
- Minimize periods of inactivity
- Maintain a positive attitude

Reference Materials

- Technical Note/02-2 - *Sustaining Health and Performance in Cold-Weather Operations*, October 2001
- TC 21-3 - Soldier's Handbook for Individual Operations and Survival in Cold-Weather Areas, March 1986
- FM 31-70 - Basic Cold Weather Manual, April 1968
- FM 21-10 - Field Hygiene and Sanitation, 21 June 2000
- FM 4-25.11 - First Aid, December 2002
- TB MED 508 – Prevention and Management of Cold Weather Injuries, April 2005

QUESTIONS?

