

## **COLD INJURIES**

### Cold Response

- Circulation is reduced to the area to prevent heat loss.
- The area may be pale, cold.
- It may have sensation or be numb.

### Frostnip

- Freezing of top layers of skin tissue
- It is generally reversible
- White, waxy skin, top layer feels hard, rubbery but deeper tissue is still soft
- Numbness
- Most typically seen on cheeks, earlobes, fingers, and toes

### Treatment

- Rewarm the area gently, generally by blowing warm air on it or placing the area against a warm body part (partner's stomach or armpit)
- Do not rub the area - this can damage the affected tissue by having ice crystals tear the cell

### Frostbite

- Skin is white and "wooden" feel all the way through
- Superficial frostbite includes all layers of skin
- Numbness, possible anesthesia
- Deep frostbite can include freezing of muscle and/or bone, it is very difficult to rewarm the appendage without some damage occurring

### Treatment

- Superficial frostbite may be rewarmed as frostnip if only a small area is involved
- If deep frostbite, see below for rewarming technique

### Rewarming of Frostbite

- Rewarming is accomplished by immersion of the affected part into a water bath of 105 - 110 degrees F. No hotter or additional damage will result. This is the temperature which is warm to your skin. Monitor the temperature carefully with a thermometer.
- Remove constricting clothing. Place the appendage in the water and continue to monitor the water temperature. This temperature will drop so that additional warm water will need to be added to maintain the 105 - 110 degrees. Do not add this warm water directly to the injury.
- The water will need to be circulated fairly constantly to maintain even temperature. The affected appendage should be immersed for 25 - 40 minutes.
- Thawing is complete when the part is pliable and color and sensation has returned. Once the area is rewarmed, there can be significant pain.
- Discontinue the warm water bath when thawing is complete.
- Do not use dry heat to rewarm. It cannot be effectively maintained at 105 - 110 degrees and can cause burns further damaging the tissues.

- Once rewarming is complete the injured area should be wrapped in sterile gauze and protected from movement and further cold.
- Once a body part has been rewarmed it cannot be used for anything. Also it is essential that the part can be kept from refreezing. Refreezing after rewarming causes extensive tissue damage and may result in loss of tissue. If you cannot guarantee that the tissue will stay warm, do not rewarm it.

### Trench Foot - Immersion Foot

Trench foot is caused by prolonged exposure of the feet to cool, wet conditions. This can occur at temperatures as high as 60 F if the feet are constantly wet.

Wet feet lose heat 25x faster than dry, therefore the body uses reduced blood flow to shut down peripheral circulation in the foot to prevent heat loss.

Skin tissue begins to die because of lack of oxygen and nutrients and due to buildup of toxic products.

The skin is initially reddened with numbness, tingling pain, and itching then becomes pale and mottled and finally dark purple, grey or blue.

Trench Foot causes permanent damage making the person more prone to cold related injuries in that area.

### *Treatment and Prevention of Trench foot*

- Includes careful washing and drying of the feet, gentle rewarming and slight elevation.
- Cases of trench foot should not walk out; they should be evacuated by litter. Pain and itching are common complaints.
- Prevention is the best approach to dealing with trench foot.
  - Keep feet dry by wearing appropriate footwear.
  - Check your feet regularly to see if they are wet. If your feet get wet (through sweating or immersion), stop and dry your feet and put on dry socks.
  - Change socks at least once a day and do not sleep with wet socks.
  - Be careful of tight socks which can further impair peripheral circulation. Foot powder with aluminum hydroxide can help.

### Chillblains

- Caused by repeated exposure of bare skin to temperatures below 60 degrees
- Redness and itching of the effected area
- Particularly found on cheeks and ears, fingers and toes
- Women and young children are the most susceptible
- The cold exposure causes damage to the peripheral capillary beds, this damage is permanent and the redness and itching will

return with exposure

### *Avoiding Frostbite and Cold related Injuries*

- "Buddy system" - keep a regular watch on each other's faces, cheeks, ears for signs of frostnip/frostbite
- Keep a regular "self check" for cold areas, wet feet, numbness or anesthesia
- If at any time you discover a cold injury, stop and rewarm the area

### Eye Injuries

#### Freezing of Cornea

- Caused by forcing the eyes open during strong winds without goggles
- Treatment is very controlled, rapid rewarming e.g. placing a warm hand or compress over the closed eye. After rewarming the eyes must be completely covered with patches for 24 - 48 hours.

#### Eyelashes freezing together

- Put hand over eye until ice melts, then can open the eye.

#### Snowblindness

- Sunburn of the eyes
- Prevention by wearing good sunglasses with side shields or goggles.
- Eye protection from sun is just as necessary on cloudy or overcast days as it is in full sunlight when you are on snow. Snow blindness can even occur during a snow storm if the cloud cover is thin.

### *Symptoms*

- Occur 8-12 hours after exposure
- Eyes feel dry and irritated, then feel as if they are full of sand, moving or blinking becomes extremely painful, exposure to light hurts the eyes, eyelids may swell, eye redness, and excessive tearing

### *Treatment*

- Cold compresses and dark environment
- Do not rub eyes