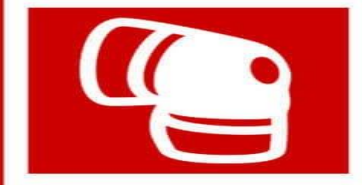




# First Aid

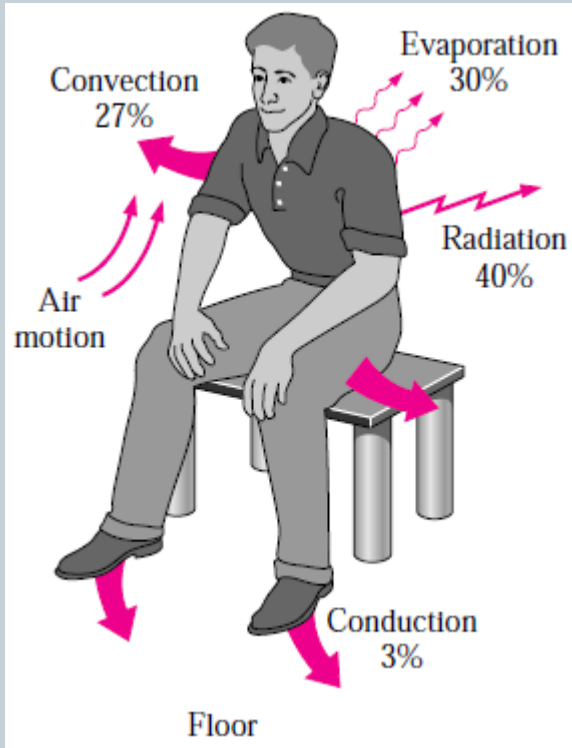




- 1.Heat-Related Illnesses :
  - (heat cramps , heat exhaustion ,
  - heat stroke )
  
- 2.Cold-Related Illnesses :
  - (Frostbite , Hypothermia )
  -
  
- 3.Decompression sickness

# WAYS THE BODY LOSES HEAT

- The body loses heat through:
  - 1) **Evaporation** of water from your skin (sweating).
  - 2) **Radiation** : is a form of heat loss through infrared rays. This involves the transfer of heat from one object to another, with no physical contact involved. For example, the sun transfers heat to the earth through radiation .This normal process of heat moving away from the body .
  - 3) **Conduction** : is the process of losing heat through physical contact with another object or body such as heat loss from sleeping on the cold ground or sitting on a metal chair.
  - 4) **Convection** : is the process of losing heat through the movement of air across the skin similar to sitting in front of a fan or having the wind blow on you.



**Evaporation**  
Loss of heat by evaporation of water

**Radiation**  
Emission of electromagnetic radiation

**Convection**  
Moving air removes radiated heat

**Conduction**  
Direct transfer by contact

A silhouette of a person in a thinking pose. Pink wavy arrows represent radiation. Yellow curved arrows represent convection. A pink arrow at the bottom represents conduction. A pink arrow at the top represents evaporation.

# HEAT-RELATED ILLNESSES



- Heat illness may be viewed as a continuum of illnesses relating to the body's inability to cope with heat .
- Body can maintain a constant temperature by balancing heat gain with heat loss. When heat gain overwhelms the body's mechanisms of heat loss, Heat illness occur .
- **Three types of heat-related illnesses :**
  1. heat cramps
  2. heat exhaustion
  3. heat stroke



People with exposure to high temperatures that overwhelm the body's thermoregulatory capacity are at risk for heat stress ( heat-related illnesses ) .

Examples : Outdoor working or exercising in hot environments and workers such as firefighters and bakery workers .

Note : The elderly and the young (younger than 15 years or older than 65 years) , The obese, and individuals whose immune systems may be compromised are at greater risk .

# HEAT-RELATED ILLNESSES (HEAT CRAMPS, HEAT EXHAUSTION, HEAT STROKE)

## 1. Heat Cramps

Heat cramps are the mildest form of heat injury and consist of painful muscle cramps and spasms especially in the legs .

Treating heat cramps is very simple, do the following:

- Remove the victim from the hot environment to a shady area .
- Stretch the calf and thigh muscles gently through the cramp. This usually results in immediate relief.
- Hydrate the victim
- Have the victim rest .



## **2. Heat Exhaustion**

Heat exhaustion is more severe than heat cramps that can develop after several days of exposure to high temperatures .



# TREATMENT OF HEAT EXHAUSTION



- Loosen the clothing.
- Move the victim to a cool an air-conditioned area or use a fan .

The treatment priority for heat exhaustion is to cool the victim. Heat exhaustion is not life-threatening (unlike heat stroke), so EMS is not needed unless the victim's condition worsens to the point of entering heat stroke. **If the victim's level of consciousness is affected, that is heat stroke.**

## 3. HEAT STROKE

### 3. Heat stroke

also known as **sun stroke** , is the most severe heat-related illness and is defined as a body temperature higher than 40°C associated with neurologic dysfunction. It is a serious, life-threatening problem that can cause death in minutes. The treatment priority with heat stroke is to **call EMS** and **cool the victim down**.

When you provide first aid for heatstroke, remember that this is a true life and- death emergency. The longer the victim remains overheated, the higher the chances of irreversible body damage or even death occurring.

# TREATMENT OF HEATSTROKE



- Notify EMS.
- Cool the victim's body immediately by dousing the body with cold water.
  - Apply wet, cold towels to the whole body.
  - Pack ice into the victim's underarms, groin, neck .(Do not let ice contact the victim's bare skin as this may cause frostbite!)
- Wetting and Evaporating measures work best.  
(Think, artificial sweating.)



- Move the victim to the coolest possible place and remove as much clothing as possible (ensure privacy).
  - Expose the victim to a fan or air-conditioner to promote cooling.
    - Immersing the victim in a cold water bath is also effective.
  - Give the victim (if conscious) cool water to drink.
    - Do not give any hot drinks or stimulants.
    - Never give an unconscious victim something to drink as it may obstruct the airway or cause vomiting.
  - Get the victim to a medical facility as soon as possible.
- Cooling measures must be continued while the victim is being transported.

# HEAT STRESS INJURIES

## HEAT CRAMPS

- Muscle cramps, pain or spasms in the abdomen, arms or legs

## HEAT EXHAUSTION

- Moist, clammy skin
- Dilated pupils
- Normal or subnormal temperature
  
- Weak pulse
- Rapid breathing

## HEAT STROKE

- Dry, red, hot skin
- Pupils constricted
- Very high body temperature
- Dizziness, confusion and/or nausea
- Pulse rapid
- Unconsciousness
- Coma
- Death

## 2.COLD-RELATED ILLNESSES : (FROSTBITE , HYPOTHERMIA )

**1.Frostbite** : is an injury caused by freezing of the skin and underlying tissues.

-) **Frostbite** is most common on the fingers, toes, nose and ears.

NOTE : If the frozen tissue is more than skin deep, this is considered Deep (severe) frostbite.



# recognize symptoms

Skin numbness

Redness or pain

Affected skin looks white or grayish-yellow color

Skin may feel unusually firm or waxy



Early symptoms of frostbite

Normal



- **Treatment for frostbite is as follows:**

Notify EMS as soon as possible or be prepared to transport victim to a medical facility, even after treatment of frostbite.

- Remove victim from cold environment, ensure there is no possibility of hypothermia.

**Gently rewarm frostbitten areas.**

Soak the frostbitten areas in warm water — (37 to 39 C). If a thermometer isn't available, test the water by placing an uninjured hand in it — it should feel very warm — not hot.

- Rewarming takes about 30 minutes. Repeat the above step by refreshing the water as it cools . Stop the soaking when the skin becomes its normal color or loses its numbness.

**Protect your skin from further damage.** If there's any chance the affected areas will freeze again. wrap them up so that they don't refreeze.

**Consider pain medicine**



# Frostbite caution

Since skin may be numb,  
victims of frostbite can harm themselves further.  
Use caution when treating frostbite.



do not walk  
on feet or toes  
with frostbite



do not use a fireplace,  
heat lamp, radiator or stove  
for warming



do not rub or massage  
areas with frostbite



do not use  
alcohol for warming



do not use a  
heating pad or  
electric blanket for warming



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## 2. Hypothermia:

- ) Hypothermia is defined as a body core temperature below 35 °C .
- ) Hypothermia is often caused by exposure to cold weather .
- ) Symptoms depend on the body core temperature .



# Hypothermia

Mild Hypothermia Body core temperature:	Moderate Hypothermia Body core temperature:	Severe Hypothermia Body core temperature
<b>32°C - 35°C</b>	<b>28°C - 32°C</b>	<b>Less than 28°C</b>
<ul style="list-style-type: none"><li>• Shivering (mild)</li><li>• Increased heart and respiratory rates</li></ul>	<ul style="list-style-type: none"><li>• Uncontrollable shivering</li><li>• Increased heart and respiratory rates</li></ul>	<ul style="list-style-type: none"><li>• shivering stops</li><li>• muscle rigidity</li><li>• unconsciousness</li><li>• Slowed breathing and heart rate (may not be able to find a pulse)</li></ul>



**Treatment for victims of hypothermia is as follows:**  
(methods to warm the body back to a normal temperature)

- Remove the victim from the cold environment.
- For cases of severe hypothermia, notify EMS.
- Remove wet clothing from the victim and replace with dry clothing. (A dry hat is recommended to be worn.)
- Wrap victim in blankets.
- Use heat packs to warm the patient. Do not allow the packs to touch naked skin.
- Victims who are Alert (conscious) may drink warm liquids. (Non-alcoholic and not hot.)

# DECOMPRESSION SICKNESS



- **Decompression sickness (DCS; also known as divers' disease, the bends or aerobullosis) is a disorder in which nitrogen dissolved in the tissue of the lung forms bubbles in the blood stream because of rapid decrease in the surrounding pressure .**

(The condition is called the bends because the joint and bone pains can be so severe they cause you to "bend" at the waist ! )

# The Bends

0 metres  
Pressure = 1 atm



A slow return to the surface lets the nitrogen return to the lungs where it is breathed out



10 metres  
Pressure = 2 atm



Nitrogen moves from high pressure in the lungs into the blood (low pressure)

Swimming up too quickly doesn't give the nitrogen enough time to leave the blood - instead it can form painful bubbles

# RECOGNITION



Bubbles can form anywhere in the body, but symptomatic sensation is most frequently observed in the shoulders, elbows, knees, and ankles.

- The “bends” (the joint and bone pains) accounts for about 60 to 70 percent of all DCS cases, with the shoulder being the most common site.
- Neurological symptoms are present in 10 to 15 percent of all DCS cases with headache and visual disturbances the most common.
- Skin manifestations are present in about 10 to 15 percent of all DCS cases.
- ) The chances of these symptoms occurring is reduced by diving for shorter periods of time at shallower depths (resulting in less nitrogen dissolving into the blood ) as well as by ascending more slowly (allowing the lungs more time to remove the gas).

# TREATMENT



- Call EMS
- Monitor ABCs and vitals
- People are treated with high-pressure / hyperbaric, oxygen ( 100% oxygen therapy.)  
(Decreasing the concentration of nitrogen )





**Thank you!**