

Cold Weather Injuries

1.0 Contact Hours

Presented by:

CEU Professor[®]

www.CEUProfessorOnline.com

Copyright © 2007 The Magellan Group, LLC
All Rights Reserved. Reproduction and distribution of these materials is
prohibited without the written consent of The Magellan Group, LLC

Cold Weather Injuries

By Joseph Knight, PA-C

Learning Objectives

1. Identify the four types of cold weather injuries and explain the differences.
2. List the four factors of weather that influence the development of a cold weather injury.
3. Define the acronym C-O-L-D and its usefulness in preventing cold weather injuries.
4. Explain why a hypothermic patient should remain lying down and resting even after he/she is alert and oriented.
5. Explain why a patient with a frozen limb should not thaw the limb until under proper medical care.

When the human body is subjected to extremely cold temperatures, blood vessels constrict and body heat is gradually lost. As the body temperature drops, tissues are easily damaged or destroyed. History is replete with examples of how cold injuries have affected the course of historical events; for example, Napoleon and Hitler were defeated not by the opposing armies, but by the cold.

Weather (temperature, wind, precipitation and humidity) is the predominate influence in the development of cold weather injuries (CWIs). Falling temperatures, combined with high humidity, a wet environment and increasing wind accelerates the loss of body heat. Other factors that influence the development of cold injuries are the individual's level of hydration, the presence of other injuries (especially those causing a reduction in

circulatory flow), and a previous cold injury (which increases susceptibility by lowering resistance). In addition, the use of any drug (including alcohol) that modifies autonomic nervous system response or alters judgment ability can drastically reduce an individual's chance for survival in a cold environment. Like heat exposure injuries, cold exposure injuries are preventable. Acclimatization, the availability of warm, layered clothing, and the use of common sense will prevent cold weather injuries.

There are four main types of CWIs: chilblains, trench foot, hypothermia and frostbite. Before discussing these issues, a discussion of prevention is appropriate; it's much easier to prevent a CWI than it is to treat one.

Clothing

The acronym **C-O-L-D** is an easy way to remember how one can prevent a CWI:

C: Cleanliness and care. Not just of yourself, but your clothing. If one's clothes get greasy or dirty, their insulating capacity diminishes.

O: Overheating

L: Layers and looseness

D: Dry

Let's cover each one of these in detail:

C: Cleanliness. When one is out in the cold weather camping or hunting, it's difficult to stay clean; however, if clothes stay relatively clean and dry, they retain their insulating value much better. Socks and underwear can be hung up outside to freeze overnight, and then beat them against a tree to get rid of the frozen moisture.

O: Overheating. Dress in layers maintains the ability to take off or put on a coat or sweater; if one becomes overheated, a sweater can be removed. If one begins to chill, a sweater can be put on. The most important thing is to avoid sweating in cold weather by overdressing. Sweating can be deadly.

L: Layers and looseness. As mentioned above, layers of clothing are important; however, these layers have to be loose relative to your skin and to each other. The thing that keeps one warm is dead air space – the air trapped between the skin and the clothes, and between the clothes.

D: Dry. It goes without saying that dry clothes retain heat better than damp or wet clothes. The wetness doesn't have to come from a fall into the river; it could come from sweating. Again, this is where the concept of layering comes in.

There are four main types of CWIs: chilblains, immersion foot (also known as trench foot), hypothermia and frostbite.

Chilblains

Chilblains are caused by decreased circulation to the feet, such as boots laced too tightly or wearing too many pair of socks. The person will say he feels like he's walking on stones, and the soles of his feet are numb. Examine the feet – they may be cool to the touch, with pale areas and decreased sensation to touch. Chilblains aren't a serious problem; however, they can become a serious problem if not treated appropriately.

Management of chilblains involves removing the boots and socks, thoroughly (but gently) washing and drying the feet, and wrapping them in a warm (not hot) towel). This will restore circulation. If your patient feels well and the integrity of the skin is intact, he can return to his activities.

Immersion or Trench Foot:

In this CEU, the term immersion foot will be used to describe both immersion and trench foot. Immersion foot is a potentially crippling problem caused by prolonged exposure to skin to moisture. People are at higher risk if the weather is wet, or if they are wearing waterproof (such as rubber) boots or waders where sweat accumulates. The problem can also occur on the hands due to the same reasons. The best way to treat this problem is to prevent it in the first place. Keep the feet clean and dry, changing socks three or four times a day if necessary. Advise your patient to use foot powder and not to lace the boots too tightly.

If your patient does get immersion foot, the feet are wet, soggy looking, shriveled, tingle and are either numb or hurt. As the skin warms up, it can take on a bluish, reddish or blackish and waxy appearance. Blisters may develop, and these can break, leaking fluid or blood. If proper medical care isn't found rather quickly, there is the potential for the skin necrosis.

First aid: Prevent further exposure, and dry the skin carefully. DO NOT break any blisters, expose the feet to high heat, apply lotions or allow your patient to walk. Rewarm the feet with warm towels, then wrap the feet loosely and elevate them to reduce swelling. Inform him that once the circulation starts in his feet, they're going to feel like they're on fire. Then arrange for evacuation to a medical treatment facility.

Hypothermia

Hypothermia is the lowering of the body temperature to dangerous levels. There are several ways one can become hypothermic. The obvious one is a plunge in an ice-covered body of water. A very common way outdoor enthusiasts become hypothermic is getting drunk sitting around the campfire (one does not perceive cold very well when inebriated). One way to become hypothermic that not too many people think about is crawling in one's sleeping bag with all their clothes on. While they sleep, they'll be sweating, and as they sweat, their body will be cooling; that's why it's best to just wear underwear while sleeping in a sleeping bag.

If a person is hypothermic, he gets what is called the “umbles”: he fumbles, he stumbles and he grumbles. Initially, he will shiver, become irritable, confused and his speech will become slurred. As the hypothermia progresses, he’ll stop shivering, he’ll want to lie down and sleep, his heartbeat and breathing will slow, then he’ll die.

First Aid: First of all, call for medical evacuation. Prevent further exposure to the cold, and remove any wet clothing, and wrap him in a warm blanket or sleeping bag. If your patient is unconscious, strip your friend down to his underwear. Have his friend(s) strip down to their underwear, and sandwich your patient between the two so as to transfer their body heat to the patient. This is active warming (passive warming is simply covering the patient with blankets and no outside source of heat is applied). Once your patient is conscious, *keep him lying down* and give him sips of warm liquids. One of the most important things is to not let your friend up and walk around, *no matter how good he feels*. It is at this point where most people who are coming out of hypothermia have cardiac arrest because the cold blood from the limbs reaching the heart can cause arrhythmias to develop. Evacuate your patient to a medical treatment facility as soon as possible and keep him lying down.

Frostbite

There are four degrees of frostbite:

- 1st Degree: Frostnip, which involves partial freezing of the skin surface associated with stinging

- 2nd Degree: Blisters filled with clear fluid associated with numbness and a burning type of pain
- 3rd Degree: Blue-gray discoloration to the skin and blood-filled blisters
- 4th Degree: The skin is deep blue and deeply aching. The limb is essentially frozen solid.

First Aid: First of all, never rub a frostbitten part of the body with snow. It makes no sense and is counterproductive.

For 1st degree frostbite, essentially warming the hands or feet will suffice, *but not by the fire*. The sensory nerves are frozen and one cannot perceive the heat from a fire, so it's possible to receive burns. If the hands are affected, have your patient place them in his armpits, and periodically take them out to flex them to get the blood flowing. If the feet are affected, have your patient put his bare feet in a friend's armpits until his feet warm up.

2nd and 3rd Degree frostbite are each treated the same way: All one can really do is to wrap the hand or feet in warm (NOT HOT) towels, and arrange for him to be evacuated to a medical facility. Never apply any type of oils, creams, butter, bear fat or fish oil to a frostbitten area. First of all, it's not going to do any good, and secondly, when your patient reaches the hospital, the clinician will have to remove what was applied, and some skin will probably come off with it.

4th Degree: This is a nasty one requiring special care. What happens in 4th Degree frostbite is the limb has frozen down to the bone. **Never** thaw out a body part with 4th degree frostbite – *leave it frozen*. Even if your patient has to walk to safety on a frozen limb, he's better off if it stays frozen until he reaches medical care. This may sound counterintuitive, but if one thaws-out a frozen limb, he's going to have blood and fluid-filled blisters, dead skin and dead skin sloughing off. Also, if the limb is thawed and it freezes again, tissue destruction is greatly increased. Once your patient is under proper medical care, special procedures are going to be required to thaw the limb in an attempt to minimize the tissue destruction.

Cold weather injuries are easier to prevent than to treat; however, once a CWI has occurred, proper first aid in the field can minimize tissue destruction.