Chapter 2

Lesson 7

Heat Injuries

Key Words

dehydration
fatigue
heat cramps
heat exhaustion
heatstroke
perspiring
ventilation

What You Will Learn to Do

- Determine first aid treatment for heat related injuries

Linked Core Abilities

- Do your share as a good citizen in your school, community, country, and the world

Skills and Knowledge You Will Gain Along the Way

- Explain the cause and effect of heat injuries
- Associate the symptoms of the three types of heat injuries
- Explain how to treat heat cramps
- Explain how to treat heat exhaustion
- Explain how to treat heatstroke
- Define the key words contained in this lesson

Introduction

Participating in any vigorous outdoor exercise or activity on an extremely hot day can lead to serious injuries if you are not prepared. Knowing how to recognize the signs and symptoms of heat related injuries can help you prevent a life-threatening accident.

Causes

For your body to work properly, its temperature must be normal, which is around 98° Fahrenheit. You risk health problems, and even death, if your body gets too cold or too hot.

Heat injuries can occur when people are exposed to high temperatures and high humidity. When it is hot, your body cools itself by **perspiring** to sweat evaporates to carry; heat away from your body. However, you risk heat injuries when you lose large amounts of water, salt, or both through perspiring and do not replace the lost fluid, which results in **dehydration**. You also risk injury in high humidity when sweat does not evaporate as rapidly as needed to keep the body cool, causing heat to build up. The body will then perspire even more in an attempt to cool itself, losing dangerous amounts of fluids in the process.

People who may be at risk of heat injuries include those who exercise or work outside in high temperatures and high humidity, those whose bodies do not regulate heat well, such as older people, overweight people, or babies.

Key Note Terms

perspiring – giving off moisture through the pores of the skin

dehydration – the condition that results when fluids are lost from the body and are not replaced; symptoms can include thirst, weakness, exhaustion, confusion, and may result in death

Factors to Consider

When perspiring, the body can lose more than a quart of water per hour. Therefore, because the body depends on water to cool itself, you should drink plenty of water when working or playing in hot weather. Salt, which helps the body to retain water, is also lost through perspiring. In most cases, however, you do not need to consume extra salt because you obtain adequate amounts through a balanced diet. In

Figure 2.7.1: Heavy perspiring will occur when running or jogging on a hot day.
Courtesy of CACI and the U.S. Army.

fact, consuming salt during hot weather activities may pull water away from muscles and other tissues where it is needed and into your digestive tract.

In addition to water intake and diet, consider the type of clothing you wear in hot weather. Wear clothes that fit loosely but also protect the body from sunburn. Wear natural fabrics, like cotton, through which perspiration evaporates better. Some activities require extra clothing or equipment, such as football or hiking with full camping gear. Soldiers may have problems acclimating to hot weather because of the type and amount of clothing and equipment they must wear. In all of these cases, protective gear and equipment may reduce **ventilation** needed to cool the body. So, ensure clothing or uniforms fit well but are not tight, and remove extra pieces of clothing and equipment as soon as they are no longer needed.

Key Note Term

ventilation – circulation of air; a system or means of providing fresh air

Types of Heat Injuries

Overheating of the body progresses through stages. At first, a person may suffer **heat cramps**. If the person ignores the symptoms and continues exercising, working, or playing in the heat, he or she may experience **heat exhaustion**. If heat exhaustion is left untreated, **heatstroke** may follow and can be fatal.

Key Note Terms

heat cramps – a condition that is marked by the sudden development of cramps in the skeletal muscles and that results from prolonged work in high temperatures accompanied by profuse perspiration with loss of sodium chloride from the body

heat exhaustion – a condition that occurs when a person is exposed to excessive heat over a period of time, caused by the loss of water and salt from the body through excessive perspiration

heatstroke – a life-threatening condition caused by prolonged exposure to high heat

Heat Cramps

Heat cramps are muscular pains and spasms caused by the loss of salt from the body through heavy perspiring. Other symptoms may include stomach cramps, wet skin, and extreme thirst. To treat heat cramps:

1. **Move the victim to a shady area, or improvise shade.**
2. **Loosen the victim's clothing.**
3. **Slowly give the victim large amounts of cool water.**
4. **Monitor the victim and give more water as needed.**
5. **Seek medical aid if cramps continue.**

Heat Exhaustion

When people work or exercise heavily in high temperatures or in a hot, humid place, the body loses fluids through heavy sweating. **Heat exhaustion** occurs when fluids are not adequately replaced or when sweat does not evaporate because of high humidity or too many layers of clothing, causing the body to sweat even more. When the body loses a great amount of fluid, less blood flows to vital organs, resulting in a form of shock. The symptoms of heat exhaustion are as follows:

- **Heavy sweating**
- **Weakness or faintness**
- **Dizziness or drowsiness**
- **Cool, pale, moist skin**
- **Headaches**

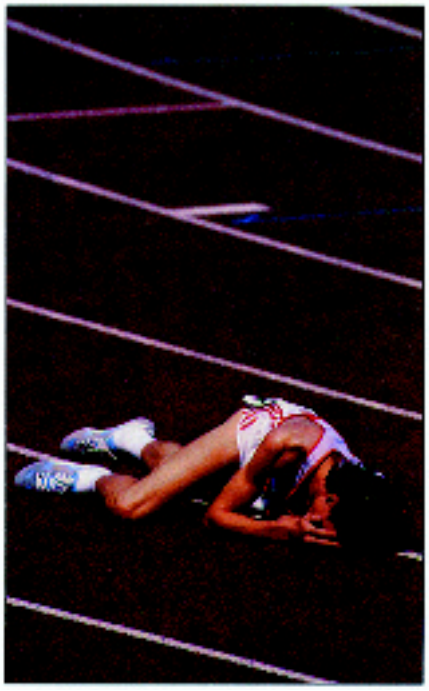

Figure 2.7.2: Heat exhaustion may occur after a person participates in vigorous exercise on a hot day.
Courtesy of Bob Daemmrick/ Stock Boston.

- **Loss of appetite**
- **Heat cramps**
- **Nausea with or without vomiting**
- **Confusion**
- **Chills**
- **Rapid breathing and pulse**
- **Body temperature above normal but below 102°F**

Treat heat exhaustion as follows:

1. **Move the victim to a cool, shady area, or improvise shade.**
2. **Loosen the victim's clothing.**
3. **Pour water on or apply cold, wet cloth to the skin. Fan the victim if it is a hot day.**
4. **Have the victim slowly drink at least one quart of water.**
5. **Elevate the victim's legs.**
6. **Monitor the victim until symptoms are gone. If symptoms continue, seek medical aid.**
7. **If possible, keep the victim from participating in heavy activity for the rest of the day.**

Heatstroke

Heatstroke, also known as sunstroke, is a medical emergency that can be fatal if not treated as soon as possible. The victim's cooling mechanism stops working when the body perspires so much that no fluids remain to produce sweat. Because

the body can no longer sweat and sweating is its defense against overheating, body temperature rises and skin becomes red and flushed. If body temperature rises high enough, brain damage and death can occur; therefore, when you encounter a heatstroke victim, you must cool the victim as fast as possible.

The symptoms of heatstroke are as follows:

- **No sweating**
- **Hot, dry, red skin**
- **Headache, dizziness, nausea, and vomiting**
- **Fast, weak pulse and shallow respiration**
- **Seizures and mental confusion**
- **Unconsciousness or sudden collapse**
- **Very high body temperature**

Treat victims of heatstroke as follows:

1. **Move the victim to a cool, shady area, or improvise shade.**
2. **Loosen the victim's clothing. Remove any outer garments and protective clothing.**
3. **Pour water on the victim or immerse in water, and fan the victim so sweat can evaporate. If you cannot immerse the victim, massage the arms and legs with cool water.**
4. **If the victim is conscious, have him or her slowly drink at least one quart of water.**
5. **Seek medical aid and transport the victim to a medical facility as soon as possible. Perform any necessary life-saving measures.**

Prevention of Heat Injuries

You can prevent heat injuries by taking just a few simple precautions and exercising a little common sense. If possible, limit your exposure to high temperatures and avoid working or exercising outside in hot, humid weather. During work or training periods, or in extremely hot climates, drink at least one quart of water every hour. Also, remember to dress for the hot weather and the activity being performed.

In the military or in the field, prevention of heat injuries is both an individual and leadership responsibility. Leaders should identify people who have a high risk of injury—basic trainees, overweight individuals, and individuals who have symptoms of **fatigue** or a previous history of heat injury. If possible, leaders should schedule heavy or strenuous activities during cooler morning or evening hours.

Key Note Term

fatigue – weakness or exhaustion due to hard work or mental effort

Conclusion

Vigorous exercise in hot weather can lead to heat cramps, heat exhaustion, or heatstroke. Familiarize yourself with the symptoms of these injuries, which can be serious or even fatal if left untreated. By knowing the signs of heat injuries, and taking precautions, you should be able to enjoy exercising outdoors, even in hot weather.

The following lesson examines cold weather injuries. You will learn about frostbite, snow blindness, and other physical problems connected with exposure to cold temperatures.

Lesson Review

1. **What are the causes of heat injuries?**
2. **What are the types of heat injuries?**
3. **How would you treat heat exhaustion?**
4. **What are the symptoms of heatstroke?**