

Lesson 5

First Aid for Burns



Key Terms

acids
alkalis
bases
caustic
compresses
flush
mottled
neutralize
scalding
smoldering
systemic

What You Will Learn to Do

- Determine first aid treatment for burns

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

- Characterize degrees of burns
- Describe how to treat first-, second-, and third-degree heat burns
- Describe how to treat electrical burns
- Describe how to treat chemical burns to the eyes and skin
- Define the key words contained in this lesson

Introduction

Burns come from sources such as heat, electricity, and chemicals. In situations where people are injured by these sources, your first aid knowledge should include how to treat them. This lesson covers different types of burns, how to treat them, and ways to prevent them.

Burns

There are several types and degrees of burns that require different treatments. Heat, electricity, and chemicals can produce different burn injuries with their severity depending upon the burn's depth, size, and location. Burns can be painful and may result in shock and infection. They can be very serious if they are spread over a large area of the body, there are other injuries involved, or the victim is very young or very old.

Degrees of Burns

For burns caused by sources of heat, there are different categories of degrees (first, second, or third) based on the burn's depth. The deeper the burn, the more severe and the higher the degree the burn is. All electrical burns are third degree.

Characteristics of First-Degree Burns

There are several characteristics of first-degree burns, as shown in Figure 2.5.1:

- **Least severe**
- **Injury to only the top layer of skin**
- **Reddening of the skin**
- **Produce mild swelling**

Figure 2.5.1 Most sunburns are first-degree burns.

Courtesy of Sinclair Stammers/Photo Researchers.



- Cause pain due to irritated nerve endings
- Heal quickly and completely if properly treated
- Caused by brief contact with hot objects, brief exposure to hot water or steam, and overexposure to sun (light sunburn) or wind

Characteristics of Second-Degree Burns

There are several characteristics of second-degree burns:

- Involve deeper layers of skin
- Cause skin to turn red and/or **mottled**
- Appear moist and oozing from the loss of fluid through damaged skin layers
- Produce blisters and swelling
- Usually the most painful type of burn because nerve endings are still intact even though tissue damage is severe.
- Burns covering a large area may cause shock due to extensive loss of fluid from the burned skin.
- Smaller second-degree burns that are properly treated should heal within two weeks with little or no scarring.
- Caused by a deep sunburn, prolonged contact with hot objects, **scalding**, and flash burns from flammable liquids suddenly bursting into flame

Characteristics of Third-Degree Burns

The specific characteristics of third-degree burns are as follows:

- Deepest and most severe type of burn
- May look white or charred (may appear to be a second-degree burn at first)
- Results in deep tissue destruction, reaching all layers of the skin and sometimes even structures below the skin
- Often cause little or no pain because nerve endings are destroyed
- Often cause shock
- Will be covered by scar tissue after healed
- Caused by immersion in extremely hot water, prolonged contact with flames, and electric shock

Treatment of Heat Burns

Treat heat burns based on their degree; therefore, before treating a burn, determine its degree and treat accordingly. When deciding the degree of a burn, in addition to the previous descriptions, it may help to know the source of the burn and/or how hot the source was, as well as how long the victim was exposed to it. If a victim appears to have a combination of burns of different degrees, determine the degree of the most burned part—usually in the middle of the burned area—and treat for that degree. If you are not sure about the degree of a burn, treat it as a third-degree burn.

Keep in mind that the goal of burn treatment is to relieve the victim's pain, prevent him/her from going into shock, and prevent infection of the burned area.

Key Note Term

mottled – marked with irregular spots or splotches of different colors or shades of color

Key Note Term

scalding – the burn of the skin by a substance that is near boiling in temperature

Key Note Term

compresses – folded cloths or pads applied to press on a body part to stop bleeding or cool a burn

Treating First-Degree Burns

To treat first-degree burns, follow these steps:

1. Loosen tight clothing and remove jewelry from the burned area before it swells. Have the victim put his/her jewelry in a safe place after removal.
2. Cool the burned part with water by either holding it under cold, running water, pouring cold water over it, immersing it in cold water, or applying cold wet **compresses** to it. Cooling the burn with water helps remove heat from the skin, relieves pain and swelling, and cleans the injury. Continue this cooling treatment for between 5 and 15 minutes until the pain subsides.
3. Gently pat the burned area dry with a clean cloth.
4. Cover the injury with a sterile bandage or clean cloth to keep air off of it, thereby reducing pain, and to provide protection against infection. Keep the bandage loose to keep pressure off of the injury.
5. After a first-degree burn is completely cooled, especially a sunburn, use a lotion or moisturizer to relieve pain and prevent drying of the skin.

Treating Second-Degree Burns

To treat second-degree burns, follow these steps:

1. For second-degree burns, follow steps one through four for treating first-degree burns. If you use running water to cool the injured part, ensure the water is not so forceful that blisters on the burned skin are broken.
2. Elevate the burned part.
3. Ensure the victim drinks plenty of liquids to avoid dehydration.
4. Seek medical treatment for second-degree burns to the face, hands, feet, or genitals or that are more than two to three inches in diameter.

Note

For extensive second-degree burns, monitor the victim for signs of shock and treat accordingly until he/she receives medical treatment. See Lesson 4 for signs and treatment of shock. For second-degree burns to the face, especially if accompanied by smoke inhalation, the victim may have respiratory burns that can lead to swelling and blockage of his/her airway. Monitor the victim's breathing and treat accordingly until he/she receives medical treatment.

Treating Third-Degree Burns

To treat third-degree burns, follow these steps:

1. Remove the victim from the source of heat if he/she is still in contact with it. (See the following section for removing a victim from a source of electricity.)
2. Call for emergency medical services (EMS). All third-degree burns require medical treatment regardless of their size. Until the victim receives treatment, follow steps 3 through 9.

3. Ensure that the victim is breathing. If not, begin mouth-to-mouth resuscitation.
4. Remove any clothing that is still **smoldering** to stop further burning. If the victim is wearing jewelry that is near or on a burned area, remove it if it comes off easily. Place the jewelry in the victim's pocket, purse, and so on, if available. If not, reassure the victim that you will give his/her jewelry to emergency medical personnel when they arrive.
5. If necessary, expose the burned area by cutting and gently lifting away any clothing. If any cloth sticks to the burn, leave it in place.

Note

If you are in a chemically contaminated area, do not expose the burned area; simply apply a dressing over the victim's clothing.

6. Cover the burned area loosely with cool moist compresses, sterile bandages, or clean cloth.

Note

Unlike treatment for first- and second-degree burns, do not cool a third-degree burn with water because this can increase the risk of shock.

7. Elevate the burned part.
8. Treat the victim for shock. Pay special attention to the victim's body temperature, which can change rapidly due to the skin being burned.
9. Monitor breathing of victims with burns to the face and burns resulting from fire accompanied by smoke inhalation. Treat accordingly.

Don'ts When Treating Burns

It is important to know what to do when treating burns, but it is equally as important to know what not to do. The following list details actions that should never be done when treating burns.

- Do not put butter, oil, or grease on a burn; these ointments can keep heat in the burn and cause more damage, as well as increase the chance of infection.
- Do not use cotton or cottony bandages on burns as they may stick to the injury.
- Do not put ice or ice water on a burn; this can result in frostbite and cause more damage to the skin.
- Do not break any blisters that have formed; blisters help protect against infection.
- Do not put pressure on a burn.
- Do not try to remove stuck clothing, debris, or loosened skin from a burn.

Key Note Term

smoldering – burning slowly without flame but often with much smoke

- Do not try to clean a wound with soap, alcohol, or any other antiseptic product; only water should be used and only on first- and second-degree burns.
- Do not let a victim walk on burned feet even if he/she tells you it does not hurt; third-degree burns can cause little pain because nerve endings are destroyed, but damage is severe and pressure from walking will only increase it.

Prevention of Heat Burns

There are many things you can do to prevent heat burns, including the following:

- Use caution when handling matches and starting a fire, particularly with a flammable liquid.
- If you have young brothers and sisters, store matches out of their reach.
- Use caution around hot liquids, steam, and heating and cooking equipment.
- Ensure hot tap water is not scalding before stepping into a tub or shower or putting your hands under a running faucet.
- Ensure your home has a fire extinguisher and smoke alarms.
- Never use water on an electrical fire; use a chemical fire extinguisher.
- If anyone in your household smokes, remind them not to smoke in bed.
- Keep a box of baking soda in the kitchen to smother grease fires.
- Turn pot handles on the stove so they are not sticking out where someone may bump them in passing.
- For electric cookware, do not let cords hang off the counter, where they can be caught and pull the cookware off as well.
- If a pilot light goes out on a gas appliance, make sure all burners and the stove are turned off and ventilate the area before relighting it or before using electrical switches, which make tiny sparks.
- Do not leave flammable items (such as newspapers or dishcloths) near the fireplace or on or near the stove.
- Turn off space heaters before going to sleep or leaving the house.
- Know what actions to take if a fire starts in your home and practice them with family members.

Treatment of Electrical Burns

Although an electrical shock will often produce only a minor mark on the skin, the injury can be a serious, deep-tissue burn, so treat all electrical burns as third degree. The current from an electrical shock passing through a victim's body can also result in unconsciousness and may slow or stop his or her breathing and/or heartbeat; therefore, treat electrical shock as a potentially life-threatening injury.

If you believe a person has been electrocuted, assess the situation first *before* touching the victim. He or she may still be in contact with the electrical current, and if you touch him or her, you could become a victim of electrical shock as well. Follow these steps to avoid a double accident and provide first aid treatment:

1. If the victim is still in contact with the source of electricity, stop the current.

Shut off the electrical current by unplugging a cord, removing a fuse from the fuse box, or turning off the circuit breaker, as appropriate. Remember that in many cases, just turning off a wall or appliance switch does not stop the electrical flow. Even though you have shut off the electrical current, to be completely safe, move the victim away from the electrical source before continuing. Proceed to step 3.

If you cannot turn off the electricity or you are outside and the shock is due to a downed power line, either call the power company yourself if you have a phone near you, or if there are other people around, have someone else call the power company. Meanwhile, since it may take you less time to separate the victim from the current than to wait for the power to be cut off, proceed to step 2. Or, if you are alone and/or there is no phone readily available in this situation, proceed to step 2.

2. Separate the victim from the source of electrical current (see Figure 2.5.2).

Push the victim off of or away from the source of electricity—or push the source of electricity off of or away from the victim—using a dry nonconducting material (wood, plastic, cardboard) like a broom, stick, or chair. If available, also stand on something dry and nonconducting, like newspaper or a rubber mat, as you disengage the victim.

If pushing does not work, use a dry rope or dry clothing to lift or drag the victim off of or away from the source of electricity. This method works better if there are two rescuers: one to lift the victim off and the other to push the electrical source away.

Special Precaution

If the ground is wet, do not attempt to move a victim in contact with an electrical current. Water conducts electricity, and you can be electrocuted as well. In this case, the current must be stopped before you can administer first aid.

3. Check the victim's breathing and pulse. Be prepared to administer mouth-to-mouth resuscitation or cardiopulmonary resuscitation (CPR) if the victim's breathing is shallow or nonexistent or his/her pulse is dangerously slow or nonexistent.



Figure 2.5.2: Removing a victim from the source of an electrical current.

Courtesy of CACI and the U.S. Army

4. After you are sure the victim is breathing, take the time to call EMS if you or someone else has not already done so.
5. Check the victim for two burn sites—one where the electricity entered the body and one where it exited the body. Treat the burns by following steps 4 through 9 for treating third-degree burns, including treating for shock and monitoring breathing.

Note

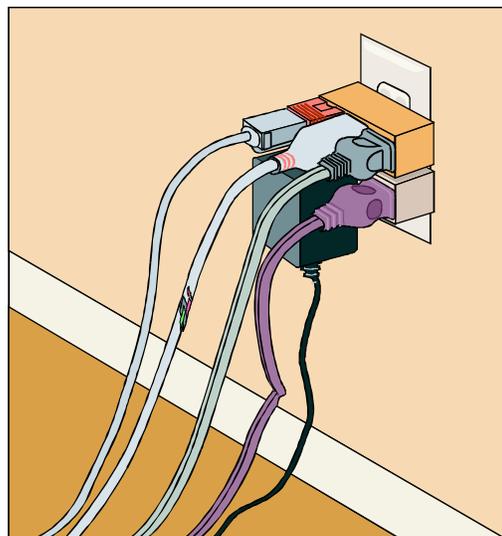
About 1,000 people die each year in the United States due to electrical shock.

Prevention of Electrical Burns

Electrical burns can be prevented if you know what to do. How to prevent electrical burns:

- Do not use electrical appliances in the tub, while showering, or in or near swimming pools.
- Do not use electrical equipment outdoors if it is raining or the ground is wet.
- Ensure electrical equipment you use outdoors is made for outdoor use, with three-way ground plugs and heavier wiring.
- Ensure outdoor electrical outlets have weatherproof covers.
- If you have very young brothers or sisters, ensure there are child safety plugs in all electrical outlets.
- Do not overload an outlet by plugging in several appliances in a “piggyback” fashion (see Figure 2.5.3).
- Do not use electrical appliances or equipment that have exposed wiring or frayed cords or that overheat or create sparks.
- Do not climb trees that have wires running through or near them.

Figure 2.5.3: Unsafe electrical outlet.



- Look for overhead wires before using long tools like tree trimmers, pool skimmers, or ladders.
- Stay inside during electrical storms; keep away from windows; do not use appliances or the phone, because lightning can travel through wires; and do not take a shower or bath, because lightning can also travel through pipes.
- If you are caught outside during an electrical storm, avoid trees, poles, and metal objects; find low ground and crouch down.

Treatment of Chemical Burns

Chemical burns occur when the skin or eyes come in contact with liquid or dry chemicals that are **caustic** or irritating. You may have products around your house, such as rust and paint removers and drain and cement cleaners, that contain **acids** designed to eat away certain materials and **bases** (also called **alkalis**) used to cut through grease. If used carelessly or improperly, these products may also do the same to your clothes and skin.

The seriousness of a chemical burn depends on the

- Length of time the chemical is in contact with the skin or eyes
- Concentration of the chemical; the more concentrated, the more damaging
- Temperature of the product containing the chemical; the higher the temperature, the quicker the damage.

Treatment of chemical burns involves stopping the chemical action immediately by removing the chemical from the skin or eyes and by removing contaminated clothing that can transmit absorbed chemicals to the skin. Treatment will vary depending on the type of chemical involved, so if there are first aid instructions on the label of the chemical product causing the burn, follow those instructions. If not, use the following basic guidelines for treatment.

Treating Chemical Burns to the Skin

To treat chemical burns to the skin, follow these steps:

1. Depending on the extent of chemical coverage on the victim or in the area, consider wearing gloves and/or safety goggles, if available, to protect yourself from chemical injuries while assisting the victim.
2. Remove any contaminated jewelry or clothing from the victim, including shoes and socks where chemicals can collect.
3. Remove the chemical from the skin.

For liquid chemicals, **flush** them from the contaminated skin with large amounts of cool running water for at least 15 minutes.

For dry chemicals, brush them off the skin using a clean, dry cloth. Take care to keep the chemicals from blowing into your eyes or the victim's eyes and avoid brushing the chemicals onto your own skin. Then, if large amounts of water are available, flush the contaminated area for at least 15 minutes. If large amounts of water are not available, do not apply any water to the contaminated area because small amounts of water can react with dry chemicals causing more burning.

Key Note Terms

caustic – capable of destroying or eating away by chemical action; corrosive

acids – chemical compounds with a sour taste that have a pH value of less than 7, react with metals to form hydrogen gas, and have the capability to eat away or dissolve metals and other materials

bases – chemical compounds with a slippery or soapy feel that react with acids to form salt, have a pH value above 7, and are used as cleaning materials

alkalis – any base, such as soda or potash, that is soluble in water, combines with fats to form soap, neutralizes acids, and forms salts with them

Key Note Term

flush – to cleanse or wash out with running water or another liquid

Key Note Term

systemic – affecting the body in general; acting throughout the body after absorption or ingestion



Figure 2.5.4: When flooding the eye, be careful the chemical does not get into the other eye.

Courtesy of Susan Spellman.

Key Note Term

neutralize – to make chemically neutral

Note

If the victim says he/she feels the burning has intensified after you have finished flushing the contaminated area, flush for several more minutes, or longer, as necessary.

4. Cover the burned area loosely with dry, clean bandages or cloths.
5. Minor chemical burns generally heal without further treatment; however, call the EMS for:
 - Any chemical burn to the face, hands, feet, genitalia, or joints
 - Second-degree chemical burns over two to three inches in diameter
 - All third-degree chemical burns
 - If there is a **systemic** reaction to the chemical burn and/or chemical exposure

Note

For extensive or severe chemical burns, monitor the victim for signs of shock and treat accordingly until he/she receives medical treatment. For a victim with chemical burns to the face or who may have inhaled chemicals, monitor his/her breathing in case of possible respiratory burns and swelling. Treat accordingly until medical help arrives.

Treating Chemical Burns to the Eyes

To treat chemical burns to the eyes, follow these steps:

1. Position the victim's head so that the injured eye is lower than the uninjured eye. This will prevent the chemical from getting into the uninjured eye (see Figure 2.5.4). If both eyes are injured, proceed to Step 2.
2. If there is only one injured eye, hold the eyelids of the injured eye open and flush with water from the inner corner of the eye (closest to the nose) to the outer corner (closest to the ear). Flush for at least 15 minutes. If both eyes are injured, flush both at the same time.
3. To keep the victim from moving his/her injured eye(s), have the victim close both eyes, then cover them with cloth pads or gauze taped loosely into place. Because eyes move together, both eyes must be closed and covered to keep the injured eye still.
4. Call the EMS or transport the victim to the emergency room.

Don'ts When Treating Chemical Burns

Follow the don'ts listed earlier in this lesson in *Don'ts When Treating Burns*. In addition, do not put any other chemicals on a chemical burn in an attempt to **neutralize** the chemical causing the burn—for example, putting an acid on an alkali and vice versa.

Prevention of Chemical Burns

Chemical burns can be prevented, if you know what to do. To help prevent chemical burns:

- **Before using any chemical product, read the label—including precautions or warnings—then follow the instructions for use.**
- **If you have younger brothers or sisters, ensure chemical products are stored out of their reach.**
- **Use chemical products in a well-ventilated area.**
- **Do not mix different chemical products; they may react with each other causing hazardous conditions. For example, mixing bleach and ammonia results in dangerous fumes.**
- **To avoid confusion and accidental misuse of chemical products, leave them in their original containers with their labels intact.**

Conclusion

You have just learned important procedures for treating burns as well as when to apply basic first aid and life-saving skills in these situations. Remember that although it is important to administer first aid treatment as quickly as possible in most situations, some rescue situations require careful assessment before you jump in to save someone so that you do not become a victim yourself. Remaining calm, thinking logically and clearly, and knowing what steps to take and when to take them, will help you to successfully perform first aid. In addition, this lesson provided many tips on how to prevent accidents from occurring in the first place.

In the following lesson, you will learn what to do in the event you need to treat poisoning, wounds, or bruises. Knowing what to do when someone ingests a poison can save a life.

Lesson Review

1. **What are some of the characteristics of first-, second-, and third-degree burns?**
2. **How can you prevent electrical burns?**
3. **What determines the seriousness of a chemical burn?**
4. **Define the term *systemic*.**