

# **THERAPEUTIC USE OF HEAT AND COLD**

## **INTRODUCTION**

Heat and cold are simple and very effective therapeutic tools. They can be used locally or over the whole body, and the proper application of heat and cold can provide pain relief, decrease swelling, help injuries heal faster than they normally would do, and help raise or lower body temperature. Improper application of heat and cold – like any improper application of a therapeutic technique – can be harmful and cause tissue damage and other injuries.

Some of the uses of heat and cold are safe and simple, but there are other ways to use heat and cold as therapies that are complex. These are best used by a health care professional as they require special equipment and training in order to use them correctly and safely.

## **OBJECTIVES**

When the student has finished this module, he/she will be able to:

1. Identify two ways the body controls heat loss and heat conservation.
2. Identify one of the body's basic responses to injury.
3. Identify how this response is both helpful and harmful.
4. Identify two basic ways heat and cold therapy can be therapeutic.
5. Identify two other ways heat and cold therapy can be therapeutic.
6. Identify the two different ways heat and cold can be applied.
7. Identify three types of clients who need careful monitoring during heat or cold therapy.
8. Identify three important assessments you must make when using heat or cold therapies.
9. Identify three basic rules of using heat and cold therapy.
10. Identify one important rule of using moist heat and moist cold.

## **BASIC PRINCIPLES OF HEAT AND COLD THERAPY**

Heat and cold can be very effective therapeutic tools. Some of the benefits and risks of using heat and cold were mentioned in the introduction, and these benefits and risks will be discussed in a subsequent section of the module. In order to be able to use heat and cold effectively and safely – in other words, in order to gain the benefits and avoid the risks – you must first understand *why* these therapies work. To understand why they work you must understand some basic information about body temperature and how body heat and is lost and conserved. You must also know some basic information about *injury and healing*.

### **Body Temperature**

Body temperature is a balance between the heat our bodies produce and the heat we lose. There are many ways we can increase or decrease the amount of heat we produce. There are also many ways we can increase or decrease the amount of heat we lose. Some

of these we can consciously control (e.g., drinking hot or cold liquids, putting on or taking of clothing), but the ones we are concerned about here are involuntary and involve the blood vessels of the circulatory system.

The blood vessels of the circulatory system are a very effective tool for conserving or losing body heat, and they do this by dilating (expanding) or constricting (narrowing). When the blood vessels *dilate*, more blood is brought closer to the surface of the skin. When that happens, the body heat we produce is transferred through the blood and escapes to the environment. When the blood vessels *constrict*, blood is kept away from the surface of the skin, so our body heat cannot escape.

**Learning Break:** The dilation and constriction of blood vessels is an involuntary reaction and is one of many methods the body has for maintaining a stable and optimal internal environment.

### **Injury and Healing**

An injury to the body can take many forms, e.g., lacerations, burn, breaks, sprains, infections, etc. When injuries occur, two things happen. First, there is pain. Pain in an injury is caused by damage to tissues, blood vessels, bones, etc. Second, the body makes attempts to heal and repair the damage. *One of the ways it does this is by dilating the blood vessels in and around the damaged area and increasing blood flow to the damaged area.* This helps the healing process by bringing oxygen and nutrients to the injured tissues and removing toxic waste products.

However, the dilation of the blood vessels and all of the increased blood flow actually *causes pain because the dilation of the blood vessels and the increased amount of blood in the area causes swelling and pressure to be applied to the area of injury.* Think about it: If you have a sprained ankle, you won't walk on it because weight bearing causes pressure and the pressure causes pain.

How do these two concepts apply to the therapeutic use of heat and cold?

- We use heat when we want to increase the blood flow to an area because heat dilates the blood vessels.
- We use cold when we want to decrease the blood flow to an area because cold constricts the blood vessels.
- We use either heat or cold depending on the situation of the injury. Heat would be applied to tissues that are infected to bring oxygen, nutrients, and white blood cells that fight infections to the infected area. Cold would help an area that is painful because of swelling (e.g., a sprained ankle) to decrease blood flow to the area and decrease pressure.

- Heat and cold can be used sequentially. Standard care for a sprained ankle is to *first* apply ice for a few days to decrease the pain caused by swelling and *then* apply heat to increase blood supply and promote healing.

### USING HEAT AND COLD SAFELY

Heat and cold can be used safely, but these therapies can also cause harm. In order to use heat and cold therapies safely, follow these guidelines:

- Only apply heat or cold if you are directed to do so by your supervisor or if these therapies have been ordered by the physician.
- Only apply heat and cold to the specific areas that have been outlined by your supervisor's instructions or the physician's orders.
- Make sure that you receive instructions or there are orders that clearly indicate what method of heat and cold should be used and how to use it, e.g., moist or dry heat, apply four times a day for 20 minutes per application, do not apply directly to the skin, etc.
- Closely monitor the client to make sure the therapy is effective.
- **Most importantly, closely monitor the client to make sure he/she is not injured by the heat or cold.** It is not unreasonable to check the area every five minutes.
- Be especially careful when applying heat or cold to *elderly clients*. Their skin is more delicate than the skin of a younger person, and they frequently do not have a large amount of insulating fat.
- Be especially careful when applying heat or cold to *infants and children* as their skin is very sensitive and can easily be damaged.
- Be careful when applying heat or cold to clients who have *dementia* or are *disoriented*. These clients may not know when they are being injured or might be unable to communicate that they are in pain.
- **Be very, very careful when applying heat to clients who have diabetes.** Diabetes decreases circulation and interferes with the sensation of pain; this makes the client with diabetes more susceptible to harm and less able to notice it. If heat or cold is improperly applied to a client with diabetes, he/she may suffer an injury but not realize the presence of the pain until damage has been done.
- Don't apply heat or cold to irritated or damaged skin. Don't apply heat or cold to an area with stitches or a surgical wound unless there is an order to do so and

never apply moist heat or cold to damaged skin or an area with stitches or an open wound: the moisture can cause infection and prevent healing.

When you are using cold or heat, it is almost always safer to avoid direct contact. Use some sort of barrier – cloth, a specialized paper cover, etc. – between the cold and the heat source, especially if you are using moist applications. The barrier prevents skin injury. Make sure you check the patient shortly after you begin the treatment, several times during the treatment, and immediately after stopping the treatment. You should closely examine the area. If you are using heat, look for burns or excessive redness. If you are using cold, look for unusually cold or pale skin or cyanosis. Cyanosis is a blue coloration of the skin caused by constricted blood vessels: remember that cold constricts the blood vessels). When using either heat or cold, check the area for normal sensation and circulation. Always make sure you document any problems and report them immediately to the RN or your supervisor. Most importantly, ask the client is the therapy was effective or if it was painful or uncomfortable. If it was, make sure you document this information and tell the RN or your supervisor.

**Learning Break:** Heat and cold should be applied for a specified time; this is usually no more than 20 minutes. *Never* exceed the prescribed time limit for heat or cold therapy. It also makes sense when you are applying heat or cold for the first time to consider a trial period of therapy that is less than the prescribed amount of time; check with the RN or your supervisor about this.

## **SPECIFIC HEAT AND COLD THERAPIES**

Heat or cold can be applied *generally* or *locally*. General application of heat or cold is used when a very high or very low body temperature puts the client's health at risk or makes the client very uncomfortable. Example: The patient has been exposed to cold and is hypothermic (body temperature less than 30°C or 86°F). However, situations in which general application of heat or cold is needed are unusual, and it is unlikely you would be caring for a client who needed this therapy.

Local application of heat or cold is very commonly used, and there are many different therapies. Common uses are to treat **sprains muscle pulls, arthritic joints, or local infections**. Some of the therapies are prepared using at-hand materials (e.g., a warm compress using a towel) and some use commercially manufactured products such as a heat lamp. There are a lot of commercially made products for heat and cold therapy, so it would be impossible to provide information on how to use each one, and that wouldn't be necessary. All of them should come with directions, each institution or facility should have a policy with instructions on how to use them, and an RN or your immediate supervisor should review their use with you if you have questions.

### **Heat Therapy**

Local application of heat can be a very effective and soothing therapy. It is very commonly used. It reduces tissue swelling, increases circulation, relaxes muscles, relieves pain, and reduces joint stiffness. Popular heat therapies include:

- **Warm compresses:** This is application of moist heat. There are several different types of warm compresses. There are commercially made reusable ones or a warm compress can be as simple as a towel that has been soaked in warm water, but the basics are the same regardless of what you use. First, prepare the compress to the *proper temperature; this is very important*. The temperature should be specified in the physician's orders or there should be a policy that specifies how hot a warm compress should be. Place a waterproof barrier underneath the area to be treated. Apply the compress then cover the compress with a barrier; the barrier prevents heat escaping to the air and helps focus the heat on the affected area.
- **Warm soaks:** A warm soak is simply immersion of a body part in warm water. Using the proper temperature is very important; the temperature can be checked with a thermometer.
- **Heating pad:** Heating pads are electrically operated devices that can be accurately set for a specified temperature. The advantage of a heating pad is that unlike a warm compress or a warm soak, the temperature stays the same for the duration of the treatment.
- **Heat lamp:** A heat lamp is a specially designed lamp that can be used to apply an accurately controlled level of heat to a very limited, specific area.
- **Sitz bath:** A sitz bath applies warm water to the perineal and genital area.

### **Cold Therapy**

Cold therapy is most often used to decrease pain that is caused by the swelling caused by a sprain or a fracture. Also follow the same principles as when using a warm therapy, e.g., use a barrier, use the proper temperature, check the client frequently, etc.

- **Cold compress:** Follow the basic principles of using a warm compress when applying a cold compress.
- **Cold soaks:** This is the same as a warm soak. The water temperature should be at the specified temperature.
- **Commercial cold packs**
- **Ice bags.**

All of the above are local applications of cold. It was mentioned earlier that heat and cold can be used as a general application but this is not often done. However, you may be asked to assist giving a cooling sponge bath. A cooling sponge bath is used to lower the

body temperature when a client has a fever. Cold compresses are applied at areas of the body of high circulation in order to dilate the blood vessels and increase the heat loss.

**Learning Break:** Moist and dry heat or cold are probably equally effective, but some people feel the moist applications provide more relief and may go deeper. Dry applications are easier to measure and control. There is no definite advantage to either, and both can be helpful.

## SUMMARY

Using heat and cold therapy is relatively simple and if these therapies are applied properly, they can be effective and safe. To make sure you use heat and cold in the right way, remember these points.

- Only apply heat or cold if instructed to do so by the RN or your supervisor or if the therapy has been ordered by a physician.
- Only apply heat or cold using the specific therapy that has been ordered, only apply heat or cold to the specific area that the therapy has been ordered for, and only use heat or cold for the specified amount of time.
- Check the client frequently in order to prevent injuries, detect injuries, and determine if the therapy is effective.
- Look for signs and symptoms of burns, decreased circulation, and decreased sensation and ask the client if the therapy is painful.
- Make sure you document any adverse effects or client discomfort, and make sure these are reported immediately.
- Be especially careful and conscientious when applying heat or cold to infants and children, the elderly, clients who have dementia or are disoriented, or who have diabetes.
- Don't apply heat or cold – especially moist heat or cold – to areas of broken skin, to irritated skin.
- Never apply moist heat or cold to an area with stitches or a surgical wound. Some times dry heat or cold can be used for these areas.