

# Using Ice in a therapeutic setting



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## **Introduction**

Although one of the oldest known therapies, it has received little attention from the research community.

## **Physiological Effects**

The physiological effects of hydrotherapy may be classified as thermal, mechanical, and chemical.

The **thermal effects** are produced by the application of water at temperatures above or below that of the body. The greater the variation from body temperature, the greater the effect produced, other factors being equal. The most commonly utilized effect, therapeutically, is thermal.

## **Effects of Cold Applications**

Although the applications may vary, the principles and effects remain consistent. The primary or direct effect of cold applications is a depressant in nature, leading to a decrease in function, either locally or systemically, depending on the application. The longer and colder the application, the longer and more intense will be the depressant effect. However, as the body responds to the cold application there is a return to normal function, which may lead to a state of increased activity. This is known as the secondary, or indirect effect of cold, also termed the "reaction."

If the cold application is a short one, the reaction follows quickly, its intensity reflecting the intensity (i.e., coldness) of the application.

The **secondary** effect, or **reaction**, occurs **only** when the body has the **vitality** to respond to the cold, either following its removal from the body, in such applications as showers, sprays, baths etc., or after the body has warmed the application, in such cases as cold compresses or packs. In general, the colder the application the greater the reaction. Many hydrotherapy techniques are directed at producing the reaction to the cold application.

**COLD** - Local cooling produces a metabolic effect opposite to that of heat. Cell metabolism is reduced, thereby decreasing the need for oxygen. Accordingly local vasoconstriction occurs. However, excessive cooling, like excessive heating is potentially lethal. A protective periodic vasodilatation (shunting reaction) occurs with the cooling to maintain temperature in the viable range. The inflammatory response is reduced with cryotherapy, owing to decreased metabolism and circulation. Again, the consensual response will result in decreased circulation in sites remote from the local area being treated.

## **General Contraindications**

### **Cryotherapy**

- Raynauds disease -(a primary or idiopathic vascular disorder affecting mostly women)
- Cold hypersensitivity
- Presence of cold hemagglutinins (e.g. paroxysma cold, hemoglobinurea, cryoglobulinemia, antibody which cause agglutination(clumping together) of erythrocytes(red blood cell or corpuscle)
- Open wound

## **Practical Applications**

Local cold is useful for a variety of conditions:

For soft tissue trauma and traumatic arthritis, in acute conditions such as soft-tissue trauma and traumatic arthritis, ice is far superior to heat for pain relief, relaxation of muscle guarding (spasm), and limitation of inflammatory response. However, most people have been conditioned to use heat for such pain, so superficial heat may bring some psychologically based benefit in relieving pain and allowing relaxation which may then secondarily relieve muscle guarding. Deep heat is contraindicated in the acute phase as this will exacerbate inflammation.

### **Sub-Acute And Chronic Arthritis Condition**

In sub-acute and chronic conditions such as chronic arthritis, superficial heat is valuable in relieving pain and stiffness. This effect is often accompanied by a secondary reduction in muscle guarding, with further relief of pain.

**Deep heat** is contraindicated in all but the very chronically arthritic joint and its use has little advantage. It may also accelerate joint destruction. Ice will relieve pain and reduce muscle guarding but may enhance stiffness. In addition it is often poorly tolerated psychologically in chronic arthritis.

### **Contractures**

(abnormal shorting of muscle tissue, rendering the muscle highly resistant to passive stretching).

**Cold** is generally detrimental in the treatment of contractures, as it reduces the ability of connective tissues to stretch. However, this effect is often superseded by the benefits of relieving pain and reducing muscle guarding, thus permitting greater stretching.

### **Spasticity**

(the state of being (spastic) hypertonic so that the muscles are stiff and movements awkward).

Cryotherapy is extremely beneficial for temporary reduction of spasticity. It also serves to decrease pain and facilitate movement of joints through their full range to limit development of contractures. Cooling acts by reducing intrafusal spindle activity, decreasing extrafusal muscle contractility, and decreasing the cutaneous sensory input that facilitates involuntary movement.

### **Tendonitis, Fascitis, Epicondylitis**

In the acute phase, these conditions respond well to local cooling for pain relief and to limit inflammatory response.

<b>System/Organ</b>	<b>Cold</b>	
	<b>Primary</b>	<b>Secondary</b>
<b>SKIN</b> blood vessels respiration heat loss	constriction decreased decreased	dilating increased increased
<b>BLOOD</b> vessels	constriction	dilation
<b>HEART</b>	rate increased	rate decreased
<b>NERVES</b>	numbed	
<b>MUSCLES</b>	volume decreased	
<b>RESPIRATION</b>	slowed and deepened	
<b>STOMACH</b>	motility and HCI increased	

# Ice as a Desensitizing Therapeutic Tool

We can make our tool by placing a paper cup in the freezer or large ice cube and you can also use a frozen ice block holder as well.

**Caution ice can burn some clients test a small area first.**

## **Application with cube.**

There are four stages of cold when applying with the ice cube directly.

1. First stage is that the area will get very cold.
2. Next the area will feel like it is burning.
3. Then there will be a cool-warm feeling.
4. Last the area will become numb.
  - **You must at all times monitor the client**
  - This type therapy can be very intense for many people.
  - Test for sensitivity by using palpation and get the client's feedback.
  - Use a pain scale number to have a base to start with as a guideline.
  - Use the ice cube by moving it in slow circular movements getting larger and smaller continuously. Remember not to stay in the same area for long period of time.
  - Always keeping in mind the clients comfort.
  - Less bulk of tissue becomes numb quicker.
  - Continually keep in communication with your client.
  - When the area becomes numb this allows the therapist to work this area more readily and vigorously.
  - At all times keeping in mind the client's safety.
  - Ice becomes a natural anesthetic.
  - Effective to work with clients with very sensitive areas or pain.
  - Test area before treatment by gliding your fingernail over the site before icing the site.
  - Test again after icing the site same as above to get feedback from the client to see if it has diminished in its sensitivity.
  - Treat area with consideration of clients complaint you will have a few seconds to a few minutes to treat the area determined by clients vitality
  - Reassess after the tissue has reached room/body temperature
  - Heat may be added at the end with more massage of the affected areas.

# Ice and stretch

Similar to the requirements as above except we will be using Ice and stretching on the muscle/muscles involved. This type therapy requires the therapist to have a very good knowledge of their muscles. At the same time the therapist can still do the therapy on the muscles known to the therapist and learn the rest of the muscles latter. It is very simple first, as before; we must determine which muscle/s harbours the restriction and then take it into a stretch. And ice it using moderate speed while continuing to apply traction onto the muscle. We will be using an ice cube; our job is not to make the muscle cold, but only to distract the muscle into allowing the restriction to release. We will follow with a towel to continue to keep the area dry and warm.

**Very important to remember the ice is only to distract the muscle and not to make it cold.** And we can use this procedure on any muscle safely.

## Ice and stretch

Check the ROM (range of motion) of you client to assess which muscles/joint need stretching.

Record the range on a chart or health history document.

Determine the stretch that you want to achieve with your client.

Place your client in that position and start to gently stretch or until a slight resistance is felt.

Ice the muscle/muscles to be stretched at a rate approximately 2.5 cm per sec, allow a slight traction/tension to the muscles and stretch within the client's tolerance.

Feel for the muscle to release and follow the release gently.

Repeat approximately three times or till the range is reached. Always up to the client's tolerance.

For the clients comfort place towels around the client to keep them dry.

Have another towel ready to dry your client.

When possible warm area up with a hot pack or a hot water bottle to further increase the stretch.

Massage the area and take the joint into ROM at least three times to reeducate the joint and muscles.

Recheck your measurements explain to client.

Provide the client with stretching homework.

**TEST ALL YOUR METHODS ON YOURSELF BEFORE APPLYING THEM ON YOUR CLIENTS. IF NOT SURE DO NOT USE THE METHOD UNTIL YOU HAVE THE RIGHT INFORMATION.**

**CAUTION NEVER USE DRY ICE.**

# How the cold application may work.

Due to the sudden cold and tactile stimulus of the ice being applied to the skin it in turn inhibits the pain and the reflex motor and autonomic responses in the central nervous system. This pain suppressing effect now permits more effective relaxation and gentle lengthening of the muscle. In addition ice over muscle attachment sites appears to reduce their sensory irritability.\*

## Information of Cold and Heat on Some Body Regions and Injuries

### **Effect on Injuries**

*Cold:* A secondary increase of skin activity, and a lessening of sensitivity. This remedy is useful for injuries. Cold stops bleeding.

*Heat:* At first there is more activity with a heat application. But the reaction causes less skin activity and less sensitivity. Heat is not to be used in initial stages of an injury as it increases tissue fluids and bleeding.

### **Effect on the Nerves**

*Cold:* A cold application numbs and paralyzes initially, but the final reaction is tonic, and it results in a vigorous feeling.

*Heat:* An application of heat first excites the nerves, but the reaction creates a lessening of tone and the result is depressant. This acts to soothe, quiet and sedate spasms and sedate spasms, and generally relax the entire body. It creates lassitude.

### **Effect on the Heart**

*Cold:* Cold causes blood vessels to contract. The heart first goes faster, then slows down. There is *increased force* in the heart action, as well as *increased tone and activity*. Cold compresses, or ice bags to the pericardia, the heart area, keep the area stable during any heat application.

*Heat:* Heat causes blood vessels to contract and widen (dilate). The Heart action slows down initially, then gets faster. There is *less force* and *lowered tone*. While this is useful in some cases, it is generally not advisable to use intense heat because of its effect on the heart.

### **Effect on Metabolism**

*Cold:* Cold increases the carbon dioxide and improves cell activity and oxidation. It increases urea excreted through the urine. This is especially true after cold half baths. Cold baths increase the acidity of urine, even the urine of alkaline vegetarian diets.

*Heat:* Heat decreases carbon dioxide and decreases the volume of the urine. The application of heat over a large area diminishes the acidity of the urine and it may become alkaline.

### **Effect on Muscles**

*Cold:* A short, cold application increases muscle ability and range. A long, cold application lessens the muscle capability and response.

*Heat:* A short, hot application reduces muscle fatigue. A long, hot application lessens ability and response.

### Anterior shoulder muscles

1A



1B



Place shoulder into extension apply slight tension until a small resistance is felt, ice from superior to inferior feel slight tension for ant shoulder muscles. Allow for release repeat 3X or range is met.

### Posterior shoulder muscles

2A



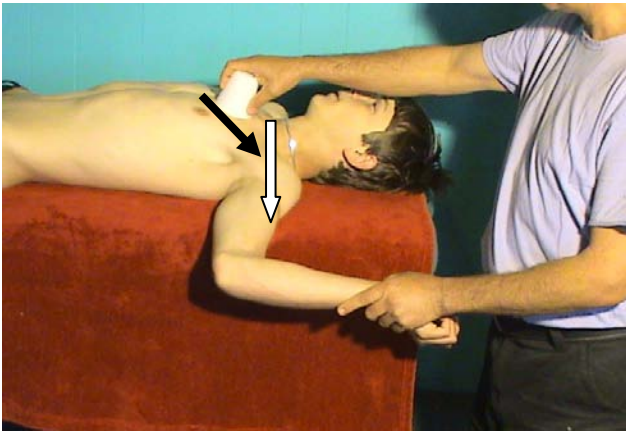
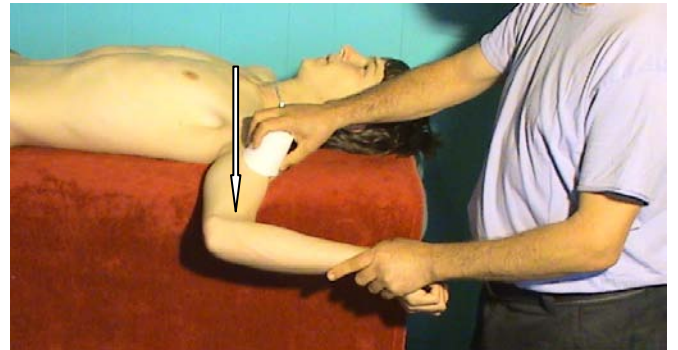
2B



Place shoulder into flexion apply slight tension until a small resistance is felt, ice from inferior to superior feel slight tension for post shoulder muscles. Allow for release repeat 3X or range is met. Tuck hand posterior to the shoulder

**Latissimus Dorsi & teres major****3A****3B**

Place shoulder into abduction apply slight tension until a small resistance is felt, ice from inferior to superior feel slight tension for post shoulder muscles. Allow for release repeat 3X or range is met. Use arm as a handle to apply traction to the muscles.

**Pectoralis major muscle****4A****4B**

Place shoulder into abduction/lat rotation apply slight tension until a small resistance is felt, ice from medial to lateral feel slight tension for post shoulder muscles. Allow for release repeat 3X or range is met. Use arm as a handle to apply traction to the Pectoralis muscle.

## Infraspinatus & Teres Minor muscle

5A



5B



Place shoulder into adduction/med rotation apply slight tension until a small resistance is felt, ice from medial to lateral feel slight tension for post shoulder muscles. Allow for release repeat 3X or range is met. Use arm as a handle to apply traction to the muscles.

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