

# Cryotherapy

## When and How to Use It in Traditional Oriental Medicine

By Dr. Kevin McNamee, D.C., L.Ac.

A patient comes to you with a hurt back (ankle, knee, shoulder or elbow, etc.). You are wondering what type of therapy to use - heat or cold (cold therapy is also known as Cryotherapy). The following explains the process you will go through in determining the type of therapy to use for treatment..

### Historical Perspective

The use of physiological therapeutics to facilitate the body's healing, has been recorded in early civilizations in both the Western and the Eastern cultures. In the Chinese Kong-Fou, written almost 4700 years ago, the use of massage is well documented. Additionally, the Japanese have widely documented the use of physiotherapy as early as 600 B.C.

### Stages of Healing

To determine which physiological therapies to use, one needs to understand the stages of healing. Musculoskeletal injuries, whether external frank trauma or internal micro-trauma, have three stages of healing. The three stages of healing include: 1. Acute Inflammatory Stage--where the body is dissolving blood elements and tissue debris--characterized by swelling, heat, redness and local pain/tenderness (The Traditional Oriental Medicine (TOM) condition is Superficial or Deep Heat with Damp, Excess and Blood Stagnation -- False Cold due to Damp); 2. Reparative Stage--where the body is laying down fibrin and fibroblasts (scar tissue) which begin the repairs--characterized by local heat, redness, tenderness, decreased circulation and decreased flexibility (The TOM condition is Superficial or Deep Heat with an Excess and Blood and/or Qi Stagnation); 3. Toughening/Remodeling or Rehabilitation Stage--where the body has fibrous deposition and chronic inflammatory reaction--characterized by palpable thickening and induration of the area (The TOM condition may be Deficiency with Stagnation of Qi). (See Table 1: Stages of Healing) **This course will concentrate on cold therapy in the form of ice and cold packs for the Acute Inflammatory Stage.**



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## **Hemorrhage and Edema in the Healing Process**

In the initial trauma, there is some degree of hemorrhage (Blood Stagnation) and edema (Damp). The healing begins when the bleeding stops. Cryotherapy (cold therapy) assists in this healing process by stopping the bleeding and inflammation (Remove Deep and Superficial Heat and Damp). Cold therapy may be applied in many forms. These include ice, cold packs, vapocoolant sprays, clay compresses, cold therapy, cold immersions, cryokinetics and alternating heat and cold.

## **Physiological Effects of Cryotherapy**

The primary effect of Cryotherapy is hypothermal, or removing heat from the body. The secondary effects include decreased blood flow, decreased metabolism, decreased inflammatory response and reduction of edema. Patients will also experience an analgesic effect.

*\*\*Leaving cold therapy on for too long may trigger 1. Local vasodilation and 2. Reflex internal vasodilation – opposite of the initial response.*

## **The General Rules of the Application of Physiotherapy**

1. In general, when applying physiotherapy, whether it be cold therapy or other therapies, it must be varied depending on the process at hand to assist the body in normalizing or adapting to the condition. The goal is to stop or reverse the abnormal reaction that is delaying the healing process. All inflammatory processes are continuous in the production of harmful effects on the patient until either the inflammatory process, or the individual's defensive powers, are defeated. Treatment frequency should be based on the condition itself, along with the major or dominant process at hand and the change in the dominant feature, during therapy.
2. Be sure you are confident with the condition you are treating. This includes knowing the condition's symptoms, pathophysiology, etc.
3. The therapy used must be suited to the patient's specific needs. In this case (the Acute Inflammatory Stage) Cryotherapy.
4. Long periods of time between treatment--once per week or more--are of little or no value and will result in failure of proper healing.
5. Avoid over treatment with certain physiotherapy modalities.

6. Explain the processes and expectations of the therapy to the patient. This includes long-term results, temporary results, the anticipated number of treatments, etc.

### **Indications and Contraindications for Cold Therapy**

Compared to other physiotherapeutic modalities, cold therapy has few contraindications or reasons not to use it. Cryotherapy is one of the safest modalities that can be used. A list of reasons to use and not use cold therapy are listed in Table 2: Indications and Contraindications of Cryotherapy

### **TOM Treatment Principles of Acute Injuries**

From a Traditional Oriental Medicine (TOM) paradigm, cold therapy is used when there is an underlying heat and/or blood stagnation. The cold therapy reduces the heat below the skin and stops the hemorrhage associated with frank trauma or micro trauma.

Unfortunately, the current teaching in TOM colleges is to immediately apply heat to an acute injury with the intention of moving the apparent stagnation and the damp. The error with this application is that the body's inflammatory response is not shut down, thus, preventing or inhibiting the beginning of the healing and remodeling process to begin. Consequently, scar tissue forms on the injured muscles and thus reduces elasticity and flexibility of the related joints.

The reason for this misinterpretation, from a TOM perspective, is the acute phase is being viewed as a damp, cold with Qi and Blood stagnation. Thus the treatment given is to apply heat to the area and move the Qi and Blood.

In reality, the body's natural response to the trauma is to flood the area with fluid to reduce the heat. This response also masks the underlying heat and creates a false damp, cold appearing condition. The presence of underlying heat is borne out when the cold application is removed from the body area, but is still hot to the touch when compared to the nearby non-inflamed areas.

The TOM treatment principle for an acute injury is to first cool the underlying heat--remove the damp, cool in the blood--before proceeding to heating and Qi/Blood moving therapies.

## **Application of Ice and Cold Packs**

The initial acute phase of an injury will last about 48 to 72 (or more) hours when ice therapy is immediately applied to reduce inflammation and allow healing to progress. For maximum benefit, ice needs to be applied at least five times over a 24-hour period, with at least one hour in between applications, for circulation to return before starting the next ice treatment.

Note that ill effects to the skin--like freezer burns--do not occur until the normal skin is reduced below 50 degrees Fahrenheit. Depending on coldness of your ice pack, a paper towel between the skin and the ice pack may be required. Evaluate your ice pack cooling unit to determine if a paper towel is needed to insulate the patient's skin from the ice pack, or if the cooling unit needs to have its temperature setting adjusted.

Note: If the skin temperature does go too low, a freezer burn can occur. The localized area has a red elevated appearance, described as mottled. If this occurs, the condition will usually resolve itself in a few hours to a day or two. Application of moist warm--not hot--towels, will increase the blood flow and warm the skin.

The amount of time that ice is to be applied depends on the thickness or size of the body area. The amount of muscle and/or fat in the area will change the application time. As a general guideline, small body areas like the hand, foot, elbow and neck require a 10 minute application. Medium sized body areas like the midback, shoulder and knee require a 15 minute application. For large areas like the lower back and buttock, a 20 minute application is needed. (Table 3: Application Time of Ice)

Staying within these general time-lines is a safe bet. The old saying, "a little is good, therefore a lot is better" does not apply here. If ice is left on too long, it will produce increased swelling and make the condition worse. After the acute phase has passed, the other phases of healing can proceed. Unfortunately, I have seen patients 12 months post-injury who still have swelling, heat and local muscle spasm because they forgot to apply ice and take the injury through the acute phase of care.

## **Sensations of Cold Therapy When Applied to the Body**

The normal sequence of sensations with cold therapy is as follows: initially the ice/cold pack will feel cold, then it moves into a burning sensation (like the area is on fire, lasting for about 3 minutes), followed by aching (which lasts only about a minute) and finally numbness (almost analgesic).



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The goal of cold therapy is to allow the area being treated to become cold enough to feel numb (almost analgesic).

## **Conclusion**

Cold therapy is an important physiotherapy modality in the acute inflammatory phase of frank trauma or micro trauma. Cold therapy shuts down the associated edema, heat and hemorrhage associated with trauma so the healing process may continue through the Reparative and Toughening/Rehabilitation Stages.

The Acute Inflammatory Stage lasts for approximately 48 to 72 hours.

The application of the ice is dependent on the size of the body area involved and can range from 10 to 20 minutes. The ice needs to be done at least 5 times every 24 hours, with at least one hour between applications.

The patient will go through four sensations when cold is applied. These include the initial cold, then burning, then aching and finally numbness. Burning of the skin is to be avoided by adjusting the cooling unit and/or use of a paper towel between the ice pack and the skin.

When compared to other physiotherapeutic modalities, there are relatively few reasons not to use ice therapy; however, the contraindications to use ice should be respected in the patient's treatment plan.

Contrary to current teachings in the TOM colleges, the underlying heat and hemorrhaging must be stopped before the body may proceed to the two subsequent healing phases. The application of heat to an Acute Inflammatory Stage will make the condition worse, will take longer to heal and may cause increased scar tissue with associated reduced flexibility and loss of muscle elasticity. Cold therapy must be used in the Acute Inflammatory Stage to reduce the treatment time, increase the healing process and minimize the residuals associated with trauma. After this is done, the other heating therapies may be introduced.

<b>Table 1: Stages of Healing</b>		
<b>Stage</b>	<b>Physiological</b>	<b>TOM Condition</b>
Acute Inflammatory Stage (Duration: 48 to 72 hours)	Body is dissolving blood elements and tissue debris characterized by swelling, heat and local pain and tenderness	Superficial or Deep Heat with Damp, Excess and Blood Stagnation – False Cold due to Damp
Reparative Stage (Duration: 48 hours to 6 weeks)	Body is laying down fibrin and fibroblasts (scar tissue) which begin the repairs characterized by local heat, redness and tenderness	Superficial or Deep Heat with an Excess and Blood and/or Qi Stagnation
Toughening or Rehabilitation Stage (Duration: 3 weeks to 12 plus months)	Body is laying fibrous deposition and chronic inflammatory reaction characterized by palpable thickening and induration of the area	Deficiency with Stagnation of Qi

<b>Table 2: Indications and Contraindications of Cryotherapy</b>	
<b>Indications</b>	<b>Contraindications</b>
Sprains/strains (acute)	Impaired circulation
Bursitis, Tendinitis	Peripheral vascular disease
Prestretching of Muscles	Loss of thermal sensitivity
Relaxation of muscle spasms in patients who have had a cerebrovascular accident	Psychological opposition to ice therapy
Traumatic injuries to the central nervous system, including the spinal cord	Raynaud's disease

Swelling, heat in the muscular system	Chilblain (pernio)
Inhibit bleeding after acute trauma	Coma
Relieve pain and reduce the associated muscle spasm	Rheumatoid or gouty arthritis
Decrease blood flow to an area of acute inflammation	Cryesthesia
Spasticity	Paroxysmal cold hemoglobinuria
Burns	
Closed pressure sores	
Reduce adverse tissue changes and relieve pain in the first aid treatment of insect and snake bites	
Angiomas	
Boils and carbuncles	
Febrile states	
Herpes blisters	
Varicose ulcers	
Warts	

<b>Table 3: Application Time of Ice</b>		
<b>Size of Body Area</b>	<b>Sample Area</b>	<b>Length of Ice Application in Minutes</b>
Small	Neck, Ankle, Shin, Hands, Feet, Elbow	10 Minutes
Medium	Mid Back, Shoulder, Knee	15 Minutes
Large	Low Back, Pelvis, Buttock, Thigh	20 Minutes

References and Recommended Reading:

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