



The use of Cryotherapy (Ice) during soft tissue repair

Physiological and neurological effects of ice

Cryotherapy is the use of cooling to treat injuries. Generally, ice is used to help new injuries. When your body is injured, the damaged tissue becomes inflamed. This can cause pain, swelling, or redness. Swelling is your body's natural response to injury. Unfortunately, local swelling tends to compress nearby tissue leading to pain.

Cells starved of nourishment due to injury will soon die. These dying cells stimulate the release of histamine causing the blood vessels to dilate which increases blood supply and extra nutrients to help repair the damaged tissues. With an increase in blood supply the capillary walls become much more permeable with Protein and inflammatory substances pushed into the area causing swelling. Muscle spasm may also occur causing the muscle to contract helping prevent further movement. This may restrict blood flow and place more pressure on nerve endings, leading to increased pain.

Whilst some swelling is good and is your body's natural way of healing itself too much swelling will push the torn fibres apart and that will create more scar tissue as it heal. If the swelling is removed by using the R.I.C.E (rest, Ice, Compression and Elevation, see self care for pain and injury sheet) procedure then the fibres will stay closer together, less scar tissue will be formed and the injury will heal much quicker and more efficiently.

Cold, is best for acute (new) pain caused by recent tissue damage. Ice is used when the injury is recent, red, inflamed, or sensitive. Cold therapy can also help relieve any inflammation or pain that occurs after exercise, this is a form of acute inflammation. However, unlike heat, you should apply ice after exercise. Cold treatment can reduce post-exercise inflammation. Cold therapy can sometimes also help relieve pain in chronic (long term) injuries.

Methods of application

Cold should only be applied locally. It should never be used for more than 20 minutes at a time. You can apply cold using:

- an ice pack

- an ice towel—a damp towel that has been sealed in plastic and placed in the freezer for about 15 minutes
- an ice massage
- a cold gel pack
- a bag of frozen vegetables wrapped in a damp cloth
- Cold sprays
- Ice cup

Tips for Applying Cold

- Apply cold immediately after injury or intense, high-impact exercise.
- Always wrap ice packs in a towel before applying to an affected area to prevent ice burns
- It's alright to repeatedly ice painful or swollen tissues. However, you should give your body a break between sessions.
- Do not use ice in areas where you have circulation problems.
- Never use ice for more than 5- 20 minutes at a time depending on the size of the area you treating

Ice should only touch the skin if an ice rub is used. Otherwise, a thin fabric should be placed on the skin to buffer the skin from the ice. Yet, the ice must be perceived as cold when placed on the injured area. Proper application of ice isn't comfortable, but the results outweigh the temporary discomfort.

This cold sensation will last approximately three to five minutes until a burning sensation appears. The burning sensation will fade into an ache, followed by numbness. Beware that once numbing occurs, remove and discontinue the ice. Continued application following numbing may result in tissue damage.

Contraindications to Cryotherapy

Using cold therapy may not be a good idea for some people. Those who are very sensitive to cold will not be able to tolerate icing long enough to do any good. Contraindications are conditions in which the therapy has the potential to cause harm or make the condition worse. If the client suffers from any of the following, you should not utilize cold therapy.

- Impaired sensation. Patients cannot report when they become anesthetic from cold. Tissue damage occurs slightly below temperatures that produce numbness.
- Impaired circulation: tissue damage may result from vasoconstriction (constriction of the blood vessels)
- Open wounds after 48 hours.
- Hypersensitivity to cold, such as Raynaud's phenomenon, cold urticaria, cryoglobulinemia, and paroxysmal cold hemoglobinuria.
- Angina pectoris or other severe cardiac disease.
- Regenerating peripheral nerves.

- Arteriosclerosis
- Varicose veins
- Diabetes
- Anemia
- Heart disease
- Chills
- Skin conditions (rashes, open wounds)
- Cancer
- Additionally, ice should also not be used for patients who have rheumatoid arthritis, Raynaud's Syndrome, cold allergic conditions, paralysis, or areas of impaired sensation.

Adverse reactions to Cryotherapy

While cryotherapy can reduce unwanted nerve irritation, it sometimes can leave the tissue affected with unusual sensations, such as numbness or tingling, or with redness and irritation of the skin. These effects are generally temporary. Ice burns can also occur if the ice is left on too long or is applied directly onto the skin

More adverse effects of cryotherapy are rare, but some of the symptoms that may be associated with abnormal histamine production triggered by cooling include cold urticaria (rash), erythema (reddening of the skin), itching, sweating, and shortness of breath. More severe symptoms may develop including fainting, tachycardia (increased heart rate), dysphagia (swallowing difficulties, abdominal cramping or diarrhea). These symptoms may occur during therapy or from several minutes to even several hours following the treatment.

When applying ice never apply directly onto the skin as this may result in ice burns to the skin, instead wrap the ice in a damp cloth (a dry cloth will not transmit cold effectively).

There is on going debate over how long to apply ice. Current research suggests that during the first 24-48 hours after injury ice should be applied for 10 minutes and repeated every 2 hours. If the ice pack is left on for more than 10 minutes, a reflex reaction occurs (Hunting effect) where the blood vessels dilate (widen) and blood is again pumped into the injured area, causing further bleeding and swelling. Ice will have an analgesic (reduce pain) effect on the injured part by limiting the pain and swelling, muscle spasm may also be reduced. Whilst this has obvious benefits, be cautious about reducing the pain, as this may mask the seriousness of the injury.

During the first 24 to 72 hours after an injury be sure to avoid any form of heat at the injury site (e.g. heat lamps, heat creams, spa's, Jacuzzi's and sauna's), avoid movement and do not massage the injured area as these will increase the bleeding, swelling and pain. After the initial healing period of up to 72 hours (depending on the severity of the injury), ice massage may be incorporated into treatments. By applying stroking movements with an ice pack, the blood vessels will dilate and constrict alternately bringing an increased supply of blood and nutrients to the area, and so increasing the rate of healing. This may be done for more than 10 minutes to increase circulation.

Action to take if you have an adverse reaction to Cryotherapy

- Immediately stop the Cryotherapy treatment
- Seek medical attention if necessary

How to treat an Ice Burn

- Remove the ice or cold pack immediately
- The skin will feel numb, tingly, or itchy
- The skin below the ice pack may have changed colour or have marks on it

To reverse the effects of the burn, bring the skin surface back to normal body temperature. Soaking the affected body part in warm water is the quickest way. Use warm, not hot, water

Soak for 20 minutes, take a 20-minute break then repeat. Re-warming should occur gradually, as with frostbite treatment. Warm compresses will work too, but they need to be changed multiple times. Wrap the body part in warm towels or blankets. Be careful if using an electric blanket. Too much heat can make the burn worse.

- Check the burned area for blisters. Blisters are a sign of a second-degree burn. In they are present, drain them or have a medical professional drain them for you to promote faster healing and avoid infection. Apply antibiotic ointment and a barrier ointment such as Vaseline to keep the blistered area from sticking to dressings.
- Apply a non-stick gauze dressing. Keep it in place with stretchable bandaging tape. The wound should remain clean and dry at all times. Change the dressing frequently.
- For second-degree burns, oral antibiotics may be necessary to avoid systemic infection
- As the wound begins to heal, aloe vera gel can help hasten healing and prevent scarring. It can also be very drying. Never apply aloe vera directly to an open wound, as it may cause infection. Wait until the area has begun healing.
- Avoid further exposure to ice and the sun. It may take months for an ice burn to heal and the skin may still remain scarred even after healing