

NSAID's and Cryotherapy, Healing or Hindering?

It is common practice for non-steroidal anti-inflammatory drugs and ice application to be advised by a health professional during acute stages post injury and orthopedic surgery. Recently, some health professionals have started to question this decades-old advice and even advise against taking anti-inflammatory drugs in order not to impede the body's natural healing response. Dr. Gabe Mirkin, who is credited with coining the R.I.C.E Method (Rest, Ice, Compression, Elevation) when he wrote the Sports Medicine Book in 1978, now feels that this process, when prolonged, may actually delay healing.

In a recent study, athletes were told to exercise so intensely that they developed severe muscle damage that caused extensive muscle soreness. Although cooling delayed swelling, it did not accelerate recovery from this muscle damage (*The American Journal of Sports Medicine*, June 2013). A summary of 22 scientific articles found almost no evidence that ice and compression hastened healing over the use of compression alone, although ice plus exercise may marginally help to heal ankle sprains (*The American Journal of Sports Medicine*, January, 2004;32(1):251-261).

Healing Requires Inflammation

Inflammation is a natural part of the immune response. When you damage tissue through trauma or develop muscle soreness by exercising very intensely, you heal by using your immunity, the same biological mechanisms that you use to kill germs. When germs enter your body, your immunity sends cells and proteins into the infected area to kill the germs. When muscles and other tissues are damaged, your immunity sends the same inflammatory cells to the damaged tissue to promote healing. The response to both infection and tissue damage is the same. Inflammatory cells rush to injured tissue to start the healing process (*Journal of American Academy of Orthopedic Surgeons*, Vol 7, No 5, 1999). The inflammatory cells, called macrophages, release a hormone called Insulin-like growth Factor (IGF-1) into the damaged tissues, which helps muscles and other injured parts to heal; however, applying ice to reduce swelling after the acute phase actually delays healing by preventing the body from releasing IGF-1. The authors of one study used two groups of mice, with one group

genetically altered so they could not form the normally expected inflammatory response to injury. The other group was able to respond normally. The scientists purposefully damaged the muscles by injecting barium chloride into the tissues. The muscles of the mice that could not form the expected immune response to injury did not heal, while mice with normal immunities healed quickly. The mice that healed had very large amounts of IGF-1 in their damaged muscles, while the mice that could not heal had almost no IGF-1. (*Federation of American Societies for Experimental Biology*, November 2010)

Ice Prevents Healing Cells from Entering Injured Tissue

Applying ice to injured tissue causes blood vessels near the injury to vasoconstrict and reduce the blood flow that brings in the healing cells of inflammation (*Knee Surg Sports Traumatol Arthrosc*, published online Feb 23, 2014). Prolonged icing, over extended periods of time, can cause the tissue to die from decreased blood flow and, in extreme cases, can cause injury to nerves. Vasoconstriction followed by vasodilatation is known as Huntington's Response. This vasoconstriction leads to a decrease in the amount of blood being delivered to the area and subsequently lessens the amount of swelling. After a number of minutes, usually 5-10 minutes, the blood vessels re-open (dilate) allowing blood to return to the area. This phase is followed by another period of vasoconstriction.

Inflammation Reduction Coincides With Delayed Healing After the Acute Phase

Anything that reduces your immune response will also delay muscle healing. Thus, healing is delayed by:

- cortisone-type drugs
- almost all pain-relieving medicines, such as non-steroidal anti-inflammatory drugs like Ibuprofen (*Pharmaceuticals*, 2010;3(5)),
- immune suppressants that are often used to treat arthritis, cancer or psoriasis,
- applying cold packs or ice, and
- anything else that blocks the immune response to injury.

Ice Also Reduces Strength, Speed, Endurance and



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Feliks Perl, PTA, has been working in outpatient rehab for 7 years, recently celebrating his 5 year anniversary at KPT. He enjoys working with all patients— whether professional athletes, post-surgical, MVA or geriatric balance and gait deficient patients. Feliks stays up to date on current trends in manual therapy, strength & conditioning, nutrition and biomechanics research, merging them all in order to provide the most up to date, effective and efficient rehab possible to all of his patients. When he's not at KPT, Feliks spends family time with his wife and two small children, and enjoys working on improving his overall fitness, mountain biking, fishing, archery, and following home town sports.



Coordination

Ice is often used as short-term treatment to help injured athletes return to play. The cooling may help to decrease pain, but it interferes with the athlete's strength, speed, endurance and coordination (*Sports Med*, Nov 28, 2011). In this review, a search of the medical literature found 35 studies on the effects of cooling. Most of the studies used cooling for more than 20 minutes, and most reported that immediately after cooling, there was a decrease in strength, speed, power and agility-based running. A short re-warming period returned the strength, speed and coordination. The authors recommend that if cooling is done for effusion reduction purposes, it should be curtailed to less than five minutes, followed by progressive warming prior to returning to play.

If the injury is severe, further medical attention will be warranted. With minor injuries, it is in the athlete's best interest to begin rehabilitation immediately. Movement of the injured part is typically encouraged, as long as the movement does not increase pain and discomfort.

As far as NSAID's are concerned, there are conflicting studies on their long term use in healing process, mainly performed on lab animals. It appears that long term NSAID use can hinder the healing process through various pathways such as inhibiting satellite cell formation and secretion of prostaglandins, which play a crucial part in tendon and bone cell formation and healing process. Use of NSAIDs and ice acutely (3-7 days post injury) appears safe at this time. More research is needed for their long-term use effects.

In summary, cryotherapy is indicated in the acute stage of injury healing process along with NSAID's, but should be limited in duration. Some post-operative protocols

call for 20 minutes or greater of cryotherapy which can lead to vasodilation, the opposite of the goal when lowering the tissue swelling, as well as potentially cause delayed healing and possible tissue damage, especially if sensation is impaired. There are reports as far back as 1980 of athletes suffering permanent nerve damage from icing for 25 minutes. 10-15 minutes of cryotherapy appears to be safe in all peer reviewed literature at this time.

For the first 1-2 weeks post-operatively and post initial injury, icing frequently 10-15 minutes is recommended, and taking NSAID's only if pain and inflammation are severe and unmanageable by non-medical means. Weaning off NSAID's after a week or two, unless otherwise advised by your physician, is ideal to allow the body's natural healing processes to take place. Elevation of injured area above heart level to help manage edema and reasonable compression such as Game Ready (cryotherapy with compression that is used at Kassimir Physical Therapy) is still beneficial in the acute phase of healing. Pain free physical activity appears to accelerate the healing process and icing afterwards might not be necessary. Anecdotally however, many patients do report a reduction of soreness in the effected joint in the sub-acute phase post 10 min ice application following treatment, which is a practice commonly utilized at Kassimir Physical Therapy and is not contra-indicated in recent literature.

It is clear more research is necessary at this time to provide definitive prescriptions for ice application, but the basic scientific information is valid to raise questioning at this time and promote discussion.

KPT News Flash:

KPT EXPANSION UNDERWAY!

- Construction is in process for an expansion that will include:
- Increasing the gym space by an additional 2000 square feet
 - Additional workout/exercise equipment
 - Updated rubber flooring throughout gym
 - Cosmetic overhaul of entire clinic
 - Wellness services that will be offered:
 - Massage Therapy
 - Personal Training & Gym memberships for those patients looking to continue supervised exercise plans after discharge from Physical therapy

We expect our expansion to be completed before the New Year, so keep an eye out for our Grand Opening invitation!



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Tuesday	8:00 a.m.	–	8:30 p.m.
Wednesday	7:30 a.m.	–	8:30 p.m.
Thursday	8:00 a.m.	–	8:30 p.m.
Friday	7:30 a.m.	–	6:00 p.m.
Saturday	8:00 a.m.	–	12:30 p.m.

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information, directions, patient forms and a

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