

Important news for patients with musculoskeletal injuries and those who have recently undergone surgery or anyone whose muscles are simply tired and/or sore:

Stillness is the Enemy!

Active Recovery Is The Answer (ARITA)

By Gary Reinl



"Because of your age, I'm going to recommend doing nothing."

“One of the most important concepts in orthopedics in this century is the understanding that loading [**active recovery**] accelerates healing of bone, fibrous tissue, and skeletal muscle. Basic scientific and clinical investigations have shown that these tissues respond to certain patterns of loading by increasing matrix synthesis and in many instances by changing the composition, organization, and mechanical properties of their matrices.

Although new approaches to facilitate bone and fibrous tissue healing have shown promise (e.g., the use of cytokines, cell transplants, and gene therapy), none has been proved to offer beneficial effects comparable to those produced by loading of healing tissues.

For these reasons, patients with musculoskeletal injuries and those who have recently undergone surgery are now being treated with controlled physical activity that loads their healing tissues. Evaluation of new approaches to the promotion of healing of bone, fibrous tissue, and muscle should include consideration of the effects of loading on tissue repair and remodeling.”

**-“Loading of Healing Bone, Fibrous Tissue, and Muscle: Implications for Orthopaedic Practice,”
Journal of the American Academy of Orthopedic Surgeons, September/October 1999**

“Although initially thought to improve an individual's ability to heal, mechanical unloading [stillness] promoted by extended periods of bed rest has emerged as a contributing factor to delayed or aberrant tissue repair.”

-“Mechanical Unloading Impairs Keratinocyte Migration and Angiogenesis During Cutaneous Wound Healing”

Journal of Applied Physiology, May 2008

“The lymphatic system is a ‘scavenger’ system that removes excess fluid, protein molecules, debris, and other matter from the tissue spaces. When fluid enters the terminal lymphatic capillaries, any motion in the tissues that intermittently compresses the lymphatic capillaries [active recovery] propels the lymph forward through the lymphatic system, eventually emptying the lymph back into the circulation.

-Textbook of Medical Physiology, 10th Edition, Guyton and Hall, 2000

“Muscular atrophy regularly occurs as a consequence of immobilization or disuse [stillness] after sports injuries. Several experimental models deal with muscle atrophy and are suitable for investigations of the underlying mechanisms of muscle atrophy. Strength loss is the most evident response to atrophy. Muscle strength decreases most dramatically during the first week of immobilization; little further weakening occurs later on.

-“Muscular atrophy following immobilisation. A review”

Sports Medicine, July 1990

“Astronauts on a mission to Mars could lose nearly half their muscle strength during the long trip, giving them the physiques of senior citizens by the time they arrived [stillness], according to a new study.

Prolonged exposure to weightlessness could cause astronauts to lose more than 40 percent of their muscle strength even with regular exercise, researchers said. On a long voyage, a healthy 30- to 50-year-old astronaut could end up with the strength of an 80-year-old.

The research is detailed in the Aug. 17 edition of the Journal of Physiology.”

-“Trip to Mars Would Turn Astronauts Into Weaklings”

SPACE.com, August 2010

"Skeletal muscle also undergoes continuous repair as a result of contractile activity [active recovery] that involves participation of myokines and anti-inflammatory input."

-“Cross-talk between skeletal muscle and immune cells: muscle-derived mediators and metabolic implications”

American Journal of Physiology - Endocrinology and Metabolism, March 2013

Stillness begets congestion which promotes stillness which, when combined with congestion, leads to various forms of secondary cellular death (disuse atrophy and general tissue suffocation) and does nothing to facilitate the healing process (e.g. the movement of nourishment, stem cells and other essential elements/supplies to the damaged site, the movement of waste and other transient material [deoxygenated blood, lymph fluid, etc.] away from the damaged site, the production and distribution of the myokines that mediate various aspects of the tissue regeneration process and the remodeling of the repaired tissue).

Conversely, active recovery stimulates the removal of congestion from the damaged site which promotes and enables movement, which prevents or retards related secondary cellular death and is *the* catalyst for all aspects of the healing process noted above.

Even though this debate (stillness vs. action) was settled long ago for some, many others, until very recently, routinely recommended the granddaddy of all stillness protocols: cryotherapy (ice). And, again until very recently, most people followed that advice without question.

The corner was finally turned when the world-renowned, Harvard-trained physician that popularized the practice of icing damaged tissue publicly and unequivocal recanted his recommendation in three separate publications:

“There really wasn’t too much science and no one understood very much [about icing],” Mirkin said of his days as a student at Harvard University in the 1950s. “Since then, I’ve noticed that several studies have come out that showed the ‘R’ and the ‘I’ are just incorrect” -Gabe Mirkin, MD (the godfather of the ice age).

-“De-Iced: The End of the Cold War”

Tabata Times (<http://www.tabatatimes.com/de-iced-end-cold-war/>), November 2014

“Almost 40 years ago, I coined the term RICE (Rest, Ice, Compression and Elevation) as the treatment for acute sports injuries (The Sportsmedicine Book, 1978, P94). Subsequent research show that Rest and Ice can actually delay recovery. Mild movement helps tissue to heal faster, and the application of cold suppresses the immune responses that start and hasten recovery. Icing does help suppress pain, but athletes are usually far more interested in returning as quickly as possible to the playing field. So today RICE is not the preferred treatment for an acute athletic injury” -Gabe Mirkin, MD (the godfather of the ice age)

-“ICED! The Illusionary Treatment Option, Second Edition”

(<http://goo.gl/RpPKij>), August 2014

“When I wrote my best-selling Sportsmedicine Book in 1978, I coined the term RICE (Rest, Ice, Compression, Elevation) for the treatment of athletic injuries (Little Brown and Co., page 94). Ice has been a standard treatment for injuries and sore muscles because it helps to relieve pain caused by injured tissue. Coaches have used my “RICE” guideline for decades, but now it appears that both Ice and complete Rest may delay healing, instead of helping” -Gabe Mirkin, MD (the godfather of the ice age)

-“Why Ice Delays Recovery”

Dr.Mirkin.com (<http://drmirkin.com/fitness/why-ice-delays-recovery.html>), March 2014

The great *thaw* actually began back in 1986 when researchers published the following information in the Journal *Sports Medicine* entitled “*The use of Cryotherapy in Sports Injuries:*”

“When ice is applied to a body part for a prolonged period, nearby lymphatic vessels begin to dramatically increase their permeability (lymphatic vessels are ‘dead-end’ tubes which ordinarily help carry excess tissue fluids back into the cardiovascular system). As lymphatic permeability is enhanced, large amounts of fluid begin to pour from the lymphatics ‘in the wrong direction’ (into the injured area), increasing the amount of local swelling and pressure and potentially contributing to greater pain.”

In other words, icing damaged tissue can easily increase both swelling and pain. Drip by drip the ice continued to melt and by 2014 the negative evidence was overwhelming. Leading the way are four comprehensive review articles that all came to a common conclusion: although icing damaged tissue is popular, there are no clinical studies of its effectiveness (British Journal of Sports Medicine (2012); Journal of Emergency Medicine (2008); American Journal of Sports Medicine (2004); and Journal of Athletic Training (2004).

Think about that. After almost forty years of widespread use, there is no conclusive evidence that it helps. In fact the opposite is true, as there is irrefutable proof that icing damaged tissue delays healing, increases swelling, causes additional damage, shuts off the signals that alert you to harmful movement and lastly (sadly),

provides false hope to those who think that they are doing something good when, in fact, they are doing the opposite.

I am not sure which article or related detail pushed Dr. Mirkin over the once-frozen edge but research published in the Federation of American Societies for Experimental Biology Journal (2011) that reports that muscle inflammation – which is delayed by the application of ice – is essential for repair *is* cited by Dr. Mirkin on his website.

Here's what the Cleveland Clinic newsletter said about that research in an article that they titled: "*Hold the Ice?*"

"Researchers headed by Lan Zhou, MD, PhD, Neuroinflammation Research Center, Depart. of Neurosciences at the Cleveland Clinic, and colleagues, found that in response to acute muscle injury, inflammatory cells (called macrophages) within the damaged muscle itself were found to produce a protein called IGF-1, which is required for muscle regeneration."

Dr. Mirkin also references an article in the journal *Knee Surgery, Sports Traumatology, Arthroscopy* (February 2014) entitled, "Cold-Induced Vasoconstriction May Persist Long After Cooling Ends: An Evaluation of Multiple Cryotherapy Units," which concluded: "The depressed blood flow may dispose tissue to nonfreezing cold injury (NFCI)."

In lay terms, this means that otherwise perfectly healthy tissue can suffocate and die as a result of icing.

Although not referenced by Dr. Mirkin, the following four articles published during the past two years have certainly contributed to the widespread meltdown.

First, an October 2013 article in the European Journal of Applied Physiology entitled, "*Effect of Cryotherapy on Muscle Recovery and Inflammation Following a Bout of Damaging Exercise*" concluded: "These results do not support the use of cryotherapy during recovery."

Essentially, this means that icing damaged tissue is, at best, a waste of time.

Second, a piece in the journal *Haemophilia* (2013) entitled, "*An 'Ice Age' Concept? The Use of Ice in the Treatment of Acute Haemarthrosis in Haemophilia,*" concluded: "According to the available body of evidence, the bottom line remains: cooling interferes with coagulation and haemostasis, and the application of ice in the general population shows little or no benefit to overall outcome."

In lay terms, the means that icing damaged tissue causes leaky clots and has little-to-no upside.

Third, a 2013 article in the Journal of Strength and Conditioning Research/National Strength and Conditioning Association entitled "*Topical Cooling (Icing) Delays Recovery From Eccentric Exercise-Induced Muscle Damage*" concluded: "These data suggest that topical cooling, a commonly used clinical intervention, seems to not improve but rather delay recovery from eccentric exercise-induced muscle damage."

This basically means that icing damaged tissue is actually worse than merely wasting your time.

Finally, a 2012 article in the Journal of Haemophilia entitled, "*The Effect of Cooling on Coagulation and Haemostasis: Should 'Ice' be Part of Treatment of Acute Haemarthrosis in Haemophilia?*" concluded: "Published, general literature studies have also consistently demonstrated that experimental cooling of blood and/or tissue, both in vitro and in vivo in humans and in animal models, can significantly impair coagulation and prolong bleeding."

In sum, icing damaged tissue (stillness) is generally a bad idea and, active recovery is the answer (ARITA).