De-Iced: The End of the Cold War

Why the world's leaders in health, performance and rehab are abandoning ice as a recovery tool

by Tony Bonvechio

Over one million people have heard the Anti-ice Man's battle cry!

It takes a strong man to admit when he's wrong. So when the man who coined the term R.I.C.E. (short for Rest, Ice, Compression and Elevation, which has been the gold standard for treating injuries for over 30 years) admitted he was wrong, the sports medicine world's collective heart skipped a beat.

Dr. Gabe Mirkin, who first mentioned R.I.C.E. in his 1978 publication, *The Sportsmedicine Book*, was the godfather of ice age, bringing the practice of icing to the masses. Harvard educated and a practicing clinician for over 50 years, Mirkin shook the sports medicine world on March 16, 2014, when he posted an article on his website admitting that he'd been wrong all along, particularly about the use of ice for treating injuries.

"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."

Even still, the world of sports performance has plunged deep into the throes of a cold war. This is not a battle of economic or political differences, but rather a tug of war over the long-held superstition of icing. While one side clings desperately to the traditional practice of applying ice to a multitude of aches and pains, the anti-icing brigade grows larger by the day, refusing to rest until the opposition's arguments have melted away completely. And with some of the world's leading experts on performance and recovery shielding themselves from the freeze, it's hard to ignore the signs that the cold war may be over soon.

Gary with Cleveland Indians star pitcher Corey Kluber

The Anti-Ice Man

Gary Reinl, a lanky fellow never without running shoes and a ballcap atop his head of wispy grey hair, assumes the role of this cold war's General Patton. Reinl's book, *Iced! The Illusionary Treatment Option*, serves as the battle plan for the legions of sports medicine practitioners who have banded together against the use of ice as a recovery tool for athletes and Average Joes alike.

Upon its release in 2013, Reinl's book sent shockwaves through the sports medicine community as one of the fiercest jabs to date against the widely-accepted practice of putting ice on everything that hurts.

"It's a myth," Reinl said bluntly. "There is not a single shred of evidence in the medical literature that says that ice improves tissue regeneration or speeds the recovery process."

A thorough combing of the literature confirms Reinl's claim and yields virtually zero studies that validate the use of ice for healing. On the contrary, a 2012 study published in the *British Journal of Sports Medicine* stated that, despite the popularity of ice therapy, there are no clinical studies proving its effectiveness. More recently, a 2013 study in the *Journal of Strength and Conditioning Research* found that not only did icing not enhance recovery from strength training, it *delayed* it.

During his 40-year career in sports medicine and advocating for a pair of electrical stimulation units used by over 100 professional sports teams, Reinl spent the better part of the last decade observing every athletic trainer and physical therapist he could find, all while consuming hundreds of books and research articles about sports medicine.

"I'm not a clinician, I'm a reporter," Reinl said. "I simply started to look at what everyone did, and everyone iced, so I spent about seven or eight years interviewing head trainers and rehab directors of virtually every major sport in this country. But there was no evidence that icing worked. That became a problem."

Gary with 4-time CrossFit Games champion Rich Froning

Now, high profile figures in sports and medicine are echoing Reinl's words. Corey Kluber, star pitcher for the Cleveland Indians said, "I've never been an icer. I never liked to ice my arm. It always made it feel stiff and stuck." John Schaeffer, trainer to Olympic gold medalist speed skater Apolo Ohno, wrote on his website that he "stopped icing damaged tissue long ago" because it "indisputably delays healing, increases swelling and causes damage."

But if ice is so widely used to treat injuries, from black eyes to bee stings, why isn't there research to back it up?

"People once thought the Earth was the center of the universe too, even the educated people at the time, people who could read and write," Reinl said. "And the people who believe that ice somehow aids the recovery process simply believe a myth. It's not true and it never was true."

Pressing Charges

Well-rehearsed in his diatribe against ice, Reinl files five specific charges against his frosty foe. He rattles them off in rapid fire succession.

"One, ice delays recovery. Two, ice increases swelling. Three, ice causes additional damage. Four, ice shuts off the signals that alert you to harmful movement. And five, most importantly, it provides false hope," Reinl said. "You think you're doing something good when you're actually doing the opposite."

Like any good prosecutor, Reinl has done his homework. Armed with the lack of evidence for ice's efficacy, along with the bold anecdotal testimonials of some of the brightest minds in sports medicine and human performance, Reinl gladly dismantles the concept of icing piece by piece. Accustomed to fierce skepticism, he starts with a simple question.

"What is your intent?" Reinl always asks naysayers. The typical response is to reduce swelling or inflammation, which Reinl counters with another question: "Why would you want that?"

The Truth About Inflammation

The notion that you *want* inflammation seems confusing. Many agree that *too much* inflammation would surely be bad, which Reinl rebuts with a third, almost playful question: "How much is too much?"

This game of cat and mouse eventually leads to Reinl's explanation of the body's innate ability to regulate how much inflammation is needed to start the healing process. After millions of years, Reinl contends, our bodies can heal themselves without a bag of ice.

"Inflammation can occur without healing," Reinl said, quoting a 2003 article from *The Physician and Sports Medicine* journal, "but healing cannot occur without inflammation."

According to Dr. Craig Denegar, director of the Doctor of Physical Therapy program at the University of Connecticut, inflammation has been misunderstood for years.

"When I was in school in the 70s and 80s, the biggest problem with how we managed injuries was the understanding of inflammation," Denegar said. "The thing about ice is that it's an ineffective anti-inflammatory. If it *was* effective, we'd have people falling apart."

That's because inflammation is an essential part of the body's natural healing process. Without inflammation, cuts wouldn't seal, fevers wouldn't break and muscles wouldn't grow bigger and stronger. Crack open any physiology textbook to the chapter on the immune system and you'll find a list of three steps necessary for healing: inflammation, remodel and repair.

Gary with long drive world champion Justin James. View Gary's "The Cold Hard Facts" article here: http://garyreinl.com/articles/The-Cold-Hard-Facts.pdf

Few people know this better than Josh Stone. That's because Stone, an acquisition editor for the Human Kinetics publishing company, helps decide what goes into those textbooks.

Stone, the former sports medicine program manager at the National Academy of Sports Medicine, works with experts to create textbooks for the higher education market. During his six-year stint as an athletic trainer, first at Long Beach State University and then at San Jose State University, Stone abandoned the use of ice after a trip to Switzerland, where he observed a full staff of athletic trainers use no ice at all.

"When you look at the science behind ice, there's nothing that says it's beneficial," Stone said, citing a 2013 National Athletic Trainers' Association position stand that, after evaluating all the existing research, concluded that using ice to treat ankle sprains lacked any scientific evidence.

The first step towards healing, inflammation is triggered when the body senses a harmful event, specifically injured tissue. White blood cells like neutrophils and macrophages, which Reinl dubs the "cleanup crew," rush to the injured site to sweep away debris and bring healing nutrients. Damaged vessels constrict to quarantine the injury, while surrounding vessels open up to let nutrient-rich fluid in, causing the initial swelling.

But by applying ice to an inflamed area, you slow down the healing process, Reinl warns. Much like a winter storm grinds highway traffic to a halt, ice applies the brakes to the outflow of swelling and influx of healing nutrients.

Dr. Robert Otto, a professor of exercise science at Adelphi University in New York and co-author of the American College of Sports Medicine's *Guidelines for Exercise Testing and Prescription*, works with a wide range of populations, from triathletes to cardiac rehab patients, and recognizes the key role of inflammation in the recovery

process.

“Some people say if you reduce inflammation, you’re going to heal faster, but from my perspective, the inflammation is there for a specific purpose,” said Otto, who adds that ice only penetrates a few centimeters beneath the skin, limiting the effect of ice on deeper tissues. . “I’m not an advocate of ice. If you can tolerate the discomfort, let your body naturally heal as opposed to ancillary methods to mask the symptoms because sometimes masking symptoms just prolongs recovery.”

Otto notes that applying ice to the skin triggers a cycle of vasoconstriction and vasodilation where the blood vessels squeeze and relax, called the hunting reaction. Thought to create a rebound effect that theoretically increases blood flow, which spurred the 20-minutes-on, 20-minutes-off approach to icing, this cycle simply causes blood flow to return to baseline once the ice is removed.

“Do you really believe you need to regulate your body’s inflammatory process?” Reinl chides. “You think you’re better at it than the body is?” This rhetorical question is reminiscent of the works of revolutionary physiologist Walter B. Cannon, who coined the term “fight or flight” in his 1932 book, *Wisdom of the Body*.

Gary with Dr. Kelly Starrett. View their famous anti-icing video here: https://www.youtube.com/watch?v=0UmJVgEWZu4

Dr. Nicholas DiNubile, an orthopedic surgeon who served as the special medical advisor on physical fitness to the first Bush administration, cites Cannon’s teachings as highly influential in his shift away from ice at his Pennsylvania practice.

“Your body has these abilities that are pretty wise and keeps you in homeostasis,” DiNubile said. “I think the wiser thing is to really think about what you’re trying to accomplish and not just have that reflex where you always throw ice on something. If you injure something where you really want your body’s inflammatory response to be working, then continued use of ice is really something you need to get away from.”

In fact, ice is so effective at delaying the healing process that JC Santana, a world-renowned strength and conditioning coach specializing in combat athletes, uses ice with his mixed martial artists specifically to *stop* healing when they get hit in the octagon.

“If you hit me with a shot in the eye in the first round and I need to go 10 rounds, I want to delay the recovery process,” Santana said, “because if that eye swells up in the second or third round, they’ll stop the fight because I can’t see. So in that case, ice is very appropriate, because you want to stop the recovery and inflammation.”

But for anyone who doesn’t throw punches for a living, there may be a better way to treat bumps and bruises.

Active Recovery and the Lymphatic System

Reinl’s message reached the masses via his video interview with Dr. Kelly Starrett, a physical therapist turned CrossFit icon. The owner of CrossFit San Francisco and author of *New York Times* best-selling book, *Becoming A Supple Leopard*, Starrett called his first meeting with Reinl a “seminal moment” in his career.

“We were talking about ways to optimize performance and everything Gary said about icing was so intuitively correct,” said Starrett, who had used his fair share of ice as a physical therapist and whitewater rafting national champion. “But I didn’t just take his word for it. I verified it for myself.”

Recalling a young basketball player who suffered an anterior cruciate ligament tear in his knee, Starrett decided to forgo icing in the rehab process, instead using active recovery methods such as massage and electrical stimulation. The results were surprisingly positive.

“My outcome with him was faster and better and I was ahead of any of the benchmarks we’d ever used, but that was

"**On this matter, Reinl managed to sway [Gabe] Mirkin, who wrote, in a foreword to Iced!, 'Gary Reinl has done more than anyone else to show that cooling and immobilization delay recovery.'"**

-p. 84 of 538 writer Christine Aschwanden's popular new book "Good to Go: What the Athlete in All of Us Can Learn from the Strange Science of Recovery.

just an 'n' of one," Starrett said, referring to the variable 'n' that researchers use to quantify the number of test subjects in an experiment. The larger the value of 'n', the more reliable the results, so Starrett skipped the ice on more and more patients, producing similarly spectacular results. Between CrossFit competitors, Olympic gold medalists, military personnel and Tour de France cyclists, Starrett's 'n' grew to thousands, solidifying his abandonment of ice as the right move.

"Our sports end up being our laboratory, and we need to take the information we've learned and translate it," Starrett said. "It's our failure to do so that's been the problem. I'm a working physical therapist that treats problems and we're always looking for the best practice. Turns out icing was not a solution at all."

Now, Starrett and Reinl preach active recovery, using movement and light exercise to speed healing. Practiced by track athletes for years in the form of light jogging between sprint events, active recovery provides low-level stress to tissue, allowing it to heal and grow stronger.

"Active recovery is the answer and stillness is the enemy," Reinl said. He points out that swelling is removed from the site of injury via the lymphatic system. Part of the circulatory system, the lymphatic system is a sprawling map of one-way vessels that carry fluid toward the heart, disposing of waste products that are eventually dispelled in urine.

But there's a catch to the lymphatic system - it's completely passive, meaning that it can only move waste when muscles squeeze lymph vessels. No movement means no waste removal. In fact, when you freeze lymphatic vessels, it creates a backflow that leaks fluid back into the space between cells and *increases* swelling.

Ideally, Reinl says, people would use light exercise to jump start the healing process, but sometimes, pain or fatigue makes that impossible. So Reinl created a training program for a machine that removes swelling while you relax, and some of the world's top athletes and trainers use it religiously.

Athletes like Rich Froning, four-time CrossFit Games champion and holder of the title of "Fittest Man on Earth," can be seen on the sidelines between grueling bouts of exercise using Reinl's recovery program for the MARC PRO, an electrical stimulation unit that promotes active recovery by causing muscular contractions.

The MARC PRO, which boasts testimonials from the likes of Los Angeles Lakers head trainer Gary Vitti and Detroit Tigers head trainer Kevin Rand, helps the lymphatic system to flush waste out of injured tissues by triggering low-level muscle contractions, literally pumping "garbage out and groceries in," as Starrett frequently quips.

An over-the-counter product designed to enhance muscle recovery, many clinicians exercise their right to use the MARC PRO off-label to treat injuries with overwhelming success.

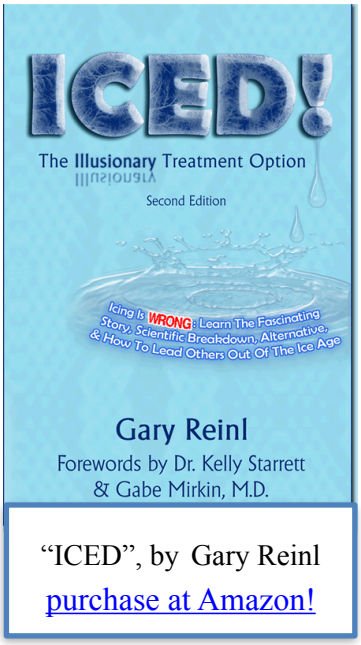
What's more, it turns out the pain-relieving properties of ice lead to a whole new host of problems.

Uncomfortably Numb

According to Reinl, the numbing sensation of ice poses a serious threat to the healing process. If you're an athlete who needs to recover quickly, he says, the relief isn't worth the risk.

"You've shut off the signals that alert you to harmful movement, so how would you know that the movement you're doing is good or bad?" Reinl said, adding that painful movement often leads to further injury and increased healing time. "The answer is, you wouldn't know. I liken the use of ice for pain control to the sympathetic bartender that gives the alcoholic a drink so he can temporarily feel better. You're not fixing the problem, you're making things worse."

Pain acts as the referee for effective active recovery. For example, after spraining an ankle, gentle pain-free movement of the toes will likely speed recovery, but pushing the pain threshold with ankle circles may further injure the afflicted ligaments. Ice can block these signals, steering you off the path to recovery.



"ICED", by Gary Reinl
purchase at Amazon!

However, many clinicians agree that for the average non-athlete, healing faster is less important than stopping the pain quickly.

"If you're talking about a competitive athlete, he has to get back to the field as soon as possible, so rest and ice are foolish because you delay healing," Mirkin said. "If you have a casual exerciser who's hurt, let him use rest and ice because they will decrease pain. They lose a day of healing, so what?"

Others aren't so sympathetic. Some believe pain is necessary to keep you from hurting yourself more.

"Ice dulls the nerve sensors on the skin so it makes you feel better, at least superficially," said Hisashi Imura, the head athletic trainer for the San Jose State University football team. "But deep down you're not helping to promote healing."

While the value of pain relief is a matter of opinion, one fact is indisputable: pain relief is not synonymous with healing. Research on non-steroidal anti-inflammatory drugs (NSAIDs) like Ibuprofen has shown that NSAIDs disrupt the inflammatory process by suppressing cyclooxygenase. This abates pain, but much like ice, can dull the warning signs that would otherwise prevent someone from moving an injured limb.

Real World Results

In the worlds of sports medicine and physical therapy, it doesn't matter what a textbook says unless it works in real life. But more trainers and therapists are seeing results without using ice on their patients and athletes.

Brandon Aiken, the assistant athletic director for sports medicine at the University of South Carolina Aiken, stopped using ice over three years ago and never looked back.

"From day one, in our basic athletic training class, ice was our friend," Aiken said. "We had our baseball players come in all the time, icing their shoulders, icing their elbows. It got to the point where I asked, 'Why are you doing that?' They'd say, 'I don't know, I've always done it.' Then I decided I'm going to stop icing things that aren't hurt. We decided to stop using ice and it's been fantastic for us."

Aiken now relies on movement - not rest or ice - to get his athletes back on the field.

"Our first priority is to take care of our athletes and do the best thing for them," Aiken said. "If we're using ice, are we really doing that? My answer is no, we're not. I have complete confidence in what we're doing and our athletes have complete confidence in us because we're seeing better results and faster recovery."

Dr. Scott Kneeler, a U.S. Army physical therapist at Fort Bragg in North Carolina, phased out ice with his soldiers when they weren't seeing results. Plus, ice proved inconvenient on the battlefield.

"The guys I work with are 100 percent results driven," Kneeler said, adding that he now uses the MARC PRO instead of ice with his soldiers. "When they see the results, it's an easy switch."

Dick Mills, former Boston Red Sox pitcher and owner of Pitching.com, used to sell a popular icing product to his clients but has since abandoned ice for an active recovery protocol he co-designed with kinesiologist Angel Borrelli.

"In the late 90s, we sold a ton of those ice things," Mills said. "I think I was their best customer."

But after talking with Dr. James Andrews, an orthopedic surgeon famous for operating on some of the world's best athletes, Mills stopped icing altogether.

“I asked him, ‘What’s the research say on icing?’” Mills said, “and he said there’s no research to support that icing works. At that point, I stopped recommending icing.”

Dr. Chad Nowlin, a physical therapist in Commerce, Texas, recalls that during one of many internships, knee replacement patients experienced excruciatingly slow recoveries, even with the use of ice. But a switch to active recovery changed everything.

“I had one patient who we hooked up to the MARC PRO for 30 minutes a day, three sessions a week and that’s it,” Nowlin said. “Within a month, her operative knee looked just like her normal knee. It blew my mind.”

Stories like this give Nowlin hope that more therapists will ditch their ice packs in favor of active recovery methods.

“It’s crazy to me how much research we have to support active recovery but still struggle to connect the dots that a cold bag of ice does nothing for what we absolutely know moves lymph fluid,” Nowlin said. “If we could get that in heavier use in every setting, we will revolutionize outcomes for physical therapy.”

The Meltdown Continues

Reinl’s words have spread like wildfire, threatening to melt away ice’s position as the go-to recovery modality. A new legion of athletic trainers and physical therapists are using less ice than ever before.

Dr. Nathan Henry, a physical therapist at the United States Army base in Fort Benning, Ga., sees countless injuries during basic training and has taken a more hands-on approach to rehabilitation.

“We were really encouraged to use our manual skills and treatment plans that consist mostly of hands-on manual therapy and exercise programs,” Henry said of his education at Baylor University. “All we’re doing is facilitating the body’s natural process, that’s it.”

Henry recognizes that a shift away from icing will take time.

“Everybody within the sports community knows the acronym R.I.C.E., and it’s taken as gospel,” Henry said. “It’s a slow moving train. We need something to take the place of ice rather than just taking something away.”

Reinl may have discovered that something with his battle cry of “A.R.I.T.A.,” which stands for “active recovery is the answer.” Other methods like massage and laser therapy are promising, but all signs point to the fact that moving is better for recovery for sitting still - especially sitting still under a bag of ice.

Mirkin believes that, deep down, most clinicians know that ice doesn’t work, but a burning need to do *something* for their aching patients prevents them from tossing their cold packs in the trash.

"There’s a famous statement in medicine: 'don’t just stand there, do something,'" Mirkin said. "And actually, it should be, 'don’t just do something, stand there.'"

Mirkin's words describe a common feeling of desperation for clinicians to get patients out the door with immediate relief, rather than facilitating the body's natural healing process.

“Resting doesn’t help heal faster,” Mirkin said. “In fact, mild movement accelerates healing."

Mirkin’s retraction of his R.I.C.E. protocol gives Reinl hope that his quest to rid ice from every athletic training room and physical therapy clinic may soon be finished.

“It’s a myth that’s run it’s course,” Reinl said. “The cold war is over.”

About the Author

Tony Bonvechio, MS, CSCS, is the co-owner of The Strength House in Worcester, MA, where he trains primarily powerlifters and team sport athletes. A former college baseball player turned powerlifter, he earned his Master’s degree in Exercise Science from Adelphi University. You can read more from Tony at bonvecstrength.com.