

Experts share tips for incorporating thermal therapies after an injury or exercise

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Everything you know about using heat or ice may be wrong—or at least outdated.

Research has proven that uncomfortable stages, like letting your body go through the [inflammation response](#), are key to proper healing. But that means anti-inflammatory methods, including over-the-counter medication and immediate icing of the affected area, may do more harm than good.

Craig Wassinger and Jeff Foucrier, physical therapy faculty members in the Tufts University School of Medicine Department of Rehabilitation Sciences, recently chatted with Tufts Now about heat and ice. Faculty for the Doctor of Physical Therapy programs in Boston and Phoenix, respectively, Wassinger and Foucrier shared tips on properly administering thermal therapies after an injury, surgery, or in simple recovery from exercise.

Both Wassinger, who is the director of research for the Boston program and studies pain responses, and Foucrier, who is a practicing physical therapist that researches educational patterns within hybrid [physical therapy](#) learning environments, agree that when you're unsure, it's a safe bet to consult with a physical therapist for the latest recommendations in treatment.

Tufts Now: What are the basic principles of heat and ice therapy that everyone should know?

Jeff Foucrier: From a vascular perspective, if you put ice on a body part, the [blood vessels](#) constrict, which brings less blood to that area, whereas heat is the opposite. When you put heat around an area, it's going to get warmer and bring more [blood flow](#) to the area to try and dissipate that heat across the rest of your body.

Ice has an anti-inflammatory effect. If you're sore, part of the reason is because you have inflammation that irritates the nerves in that area. Ice

can help because it decreases the blood flow and brings less [inflammatory markers](#) there, so it decreases the inflammatory response of the cells around that area.

For years, we've been told that inflammation is bad and that we should follow protocol like RICE, which stands for rest, ice, compression, and elevation, after an injury. Does that still hold true?

Craig Wassinger: I'm glad that you asked that question about RICE, which is what we were all taught in school before a P was added to the mnemonic to make it PRICE for protection. A lot has changed recently because ice decreases blood flow to the area and it decreases the inflammatory process to the tissues that are injured.

In that instance, what you're doing is limiting your body's ability to heal itself when you're putting ice on an acute musculoskeletal injury. Researchers are advocating that we get away from icing initially because you don't want to limit your body's ability to heal itself.

The human body has adapted over evolution to manage itself, and now we understand the science of how it can decrease inflammation on its own—and that's a good thing. Inflammation, even though it's painful, is helpful for our body tissues to recover. This same principle applies to the use of NSAIDs, which are anti-inflammatory medications, that should not necessarily be used right away because they do the same thing ice does, just more systemically versus locally.

What should someone practice instead?

JF: In the immediate management of soft tissue injury, there's a new acronym that's been encouraged by experts: PEACE and LOVE. PEACE stands for protection, elevation, avoid anti-inflammatories, compression, and education. PEACE is what you would follow initially, and LOVE

would come after, which stands for love, optimism—which speaks to the psychosocial component tied to healing—vascularization, and exercise. Notice, too, that in this there's no heat or ice. All of it is focused on allowing your body to do its job.

A lot of the neutrophils and macrophages, which are anti-inflammatory, are going to prevent good things from getting to the tissue because they're restricting the inflammation. There's evidence to show that persistent use of non-steroid anti-inflammatories can harm or slow bone recovery after injuries like fractures. If you have questions about managing pain due to a broken bone, it's best to consult with a physician or physical therapist.

In terms of injury prevention, would you recommend that someone use thermal therapies like heat or ice before a workout or strenuous activity?

CW: If you're looking to use them locally, I don't see a big benefit. For instance, if I was going to go do something with my shoulder, I wouldn't put heat or ice specifically on my shoulder before any activity. It's probably a better idea to do some type of lesser activity so that your body uses its own systems to warm up.

Your body is pretty good at doing what it's supposed to do, and if you give it a little bit of time to adjust to that by doing some smaller activities before you go do a big activity, that will increase your body temperature and the tissues around the area you're focused on. But I wouldn't recommend warming an area up with an external device like a hot pack.

You mention "warming up," which sounds like a thermal therapy in and of itself. But what's actually

happening to our bodies when we get ready for exercise or vigorous activity?

CW: There are a few things happening. Part of the response is in cardiovascular pulmonary effects. When you're increasing your heart rate, you're increasing your respiration rate, and you're moving blood more throughout your body. When you're exercising, you're doing work which is going to increase the temperature of tissues in the areas that you're exercising, and then if you do that for long enough, it's going to increase tissue temperatures throughout your body, which increases your overall body temperature, and then you start to sweat to decrease your body temperature.

Interesting! When I think of warming up, I imagine stretching. Is that right? Should everyone warm up in the same manner?

CW: What people think of as warm-ups has changed. When I was running track, we used to do stretches where you sit down with your legs outstretched and try to hold your toes, or you'd stand and pull your heel to your butt—there's not a lot of evidence that these stretches help us do anything. It doesn't necessarily help us from a performance perspective.

If you watch TV before any sporting event now, they show players warming up and they aren't just sitting there and stretching or holding one position. They're doing dynamic warm-ups like jumping jacks, push-ups, skipping and hopping, all to try to get their body moving, but not as intensely or aggressively as they would during an actual game or event. They're getting their body prepared to do the high-workload activity.

It seems like people are using thermal modalities in

scenarios that don't necessarily include recovery or exercise. Cold plunging, for instance, is one example that comes to mind. What happens to your body when you submerge yourself in an ice bath?

CW: People see athletes get in an ice tub after a game and they think it must change their inflammatory response, but it's impairing the body's normal ability to do that. If we look at inflammatory repair from a histological tissue perspective over time, going in an ice tub doesn't make a big change in the trajectory of it.

But one thing that it does that I think is cool, because I study pain, is that when someone enters a huge ice tub, the body views it as a threat because you're freezing yourself voluntarily, and your body interprets that and in turn, releases chemicals to decrease your pain. So cold plunging may not be helpful from an inflammatory perspective, but it could be very helpful for someone to decrease any pain that they have because it produces a natural chemical response similar to the effect of an opioid.

What safety measures would you share with someone who's unsure if heat or ice is appropriate treatment for an injury?

JF: If you have any doubts about the methods, be sure to ask a clinician or physical therapist. The first thing that comes to mind is if you have a loss of sensation in a specific area, because let's say you have a nerve injury and you don't feel what's on your skin, you're not going to know at what point potential damage may have occurred from the cold or the heat. My advice would be to avoid using thermal therapies in that area.

Another component is vascular conditions where you don't have proper blood flow. Let's say you have Raynaud's disease, which causes a change in blood flow to the extremities. Putting ice on a system that already vasoconstricts more than it should might damage tissue that's already been compromised.

Those are things that we as clinicians must think about and evaluate if this is what we should be doing for our patients. For instance, we're not going to put heat or ice over open wounds. It's also very important that whenever we use ice, there is always something between the skin and the modality that's being used, like a pillowcase, sheet, or towel.

With heat, when a heating pack and the skin make contact, it basically traps the heat in a certain area and doesn't allow it to escape—in this scenario, there's a lot more potential for damage. It's very important to have six to eight layers of some sort of fabric between the heating pack and the skin, which can mean wrapping a towel around the heating pack several times.

CW: I would echo that. If you're not sure if something is right for you, talk to somebody who knows about it, like your physician or physical therapist. Make sure that you are not doing any harm.

Provided by Tufts University

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