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A BLESSING OF WARMTH AND BUBBLES

Just about every spa and hot tub user reports the same thing – a good soak makes them feel relaxed and eases aches and pains. Why is that so? In this article we take a look at the physiological effects of agitated hot water, discussing why spa or tub use can be truly good for what ails you.

Spas and hot tubs offer much more than sensations of warmth and effervescence: For many soakers, time in the tub can bring pain relief, increased mobility and, in some cases, even healing.

But how does this happen? What do hot water and jet actions really do to the human body?

Pool and Spa News offers a quick overview of the physiological effects of soaking in a spa or tub. Then, in upcoming articles, we'll delve in detail into specific spa applications for customers who suffer from chronic illnesses and certain types of injuries as well as ways in which dealers can, sensibly and sensitively, help customers in their quest for relief.

HEATING UP

As anyone who has ever slid into a spa or hot tub can attest, things start happening from the very first moment of contact with the water. The most immediate sensation when settling in is one of buoyancy – followed soon after by one of enveloping warmth.

Of course, *any* water – hot or cold – will provide the feeling of near-weightlessness. What distinguishes a spa from a pool or even a cozily warm bath, say medical experts, is its high, sustained temperature, which brings about a fundamental shift in how the body's circulatory system operates.

"The heat really adds another dimension to the buoyancy that water has," says David Horay, a Berkeley, Calif., chiropractor and co-author (with David Harp) of *Hot Water Therapy*. "Any warm water will provide the benefits of buoyancy, but it won't provide the circulatory and blood-pressure benefits of a spa."

Once you've immersed yourself in the hot water, he explains, the temperature-regulating mechanisms of your body kick into gear, trying to restore and maintain a normal temperature: Your heart works harder, pumping blood to the surface in an attempt to disperse extra body heat into the air. As this increased volume of blood courses through your veins, a temporary increase in blood pressure occurs.

In trying to cool itself down, the body also begins sweating at an increased rate to bring moisture to the surface of the body, where it would under normal circumstances evaporate and lower the temperature to normal again. Because the body is immersed in hot water, however, the sweat *can't* cool the skin through evaporation. In fact, the blood brought to the skin's surface becomes even hotter because water is more effective than air at transferring heat.

As the blood continues its cycles, gathering more warmth from the surface and transporting it deep into the body, the soaker's core (or overall) temperature rises quite rapidly. In 104-degree water, studies show, a spa user's core body temperature can rise to 102 degrees Fahrenheit in well under 20 minutes. (This can pose problems, which will be addressed later.)

INSTANT RESPITE

At some point as the body's core temperature rises and circulation is enhanced, a spa user is overtaken by a powerful feeling of relaxation. So what's just happened?

According to medical experts, a second change in the body's blood pressure has occurred: As the now-warmed blood spreads throughout the body, it causes the blood vessels to expand. This dilation lessens the resistance to blood flow, and blood pressure drops.

By dilating the vessels, this warm blood has, in effect, beaten a broader path, making for an easier flow and so increasing the body's level of circulation. As this surge of warm, nourishing blood reaches deeper and deeper into the body, Horay and Harp explain, more blood vessels dilate and your muscles relax.

The warmth not only stimulates activity in the bloodstream, it also has an effect on the nervous system as well, says Thomas J. Tierney, physical therapist who is found/director of Aquatic Rehabilitation Systems and president of Aquatic Physical Therapy Resources in Woodridge, Ill. The spa water's heat, he explains, causes the central nervous system to become depressed, which contributes to muscle relaxation as well as temporary pain relief.

As Gregory Rihacek, a rheumatologist practicing in Long Beach, Calif., notes, "Hot and cold both block pain sensation and help break pain spasm cycles by stimulating the nerves to register a temperature change." While any drastic change in temperature will have this effect, he adds, most people are more comfortable with heat as the pain reliever.

The muscle relaxation that comes with using hot water also plays a significant role in relieving pain. When a muscle is tense – for whatever reason – it also pinches on particular nerves and blood vessels that run through it, adds Horay. This makes for "an unhappy muscle," he says" Not only is pressure exerted on the nerve, but blood flow is restricted (which creates an insufficient oxygen supply), and lactic acid and other metabolic wastes back up. These results can all contribute to pain. "Hot water and pressure both help the muscle to relax," says Horay. "When that happens, it means that the blood running through the vessels is able to flow more efficiently," thereby reducing pain. And, furthermore, pressure is released off the nerves.

SETTING LIMITS

Where a fever of 102 degrees might send a person straight to bed, people soaking in spas frequently reach core temperatures that high without discomfort.

That can be hazardous, say medical researchers. Indeed, prolonged high temperatures can endanger even the healthiest of adults, which is why standards set by the hiot water industry -- as well as advice from the medical community – recommend that bathers not stay in a spa or hot tub for more than 15 minutes at a time.

It also is not advisable, experts add, to perform rigorous exercise either during or after a long soak in hot water, since the heart is already working harder than usual, and blood vessels are dilated to an unusual degree.

STAYING HEALTHY

The advantage of a spa over a simple hot bath, experts also note, is that all of the above described benefits are enhanced when jet action enters the picture: The mechanical stimulation jets provide intensifies these bodily responses in individual, targeted areas of the body, helping to further reduce painful inflammation. An exception is cases of very recent injury; here initial swelling should be allowed to subside before a hot water soaking is considered.

The pressure of the jetted water can also promote healing by stimulating the body's healing mechanisms, reports Mike Casey, a registered physical therapist and owner of Granada Physical Therapy in Granada Hills, Calif.

Along with the increased oxygen level that the tissues enjoy in a spa, he explains, the heat and the pressure from the jets can raise the level of antibodies and white blood cells that provide the body's defenses. These natural bodily defenses then "destroy the bad cell around an injured area and help stimulate the formation of new tissue.

Fast, heated blood flow can also stimulate the body's self-cleansing process: Increased sweating allows the body to release toxins at an elevated rate, say the experts. In addition, as heart rate and respiration are increased, the blood carries more oxygen to the body's tissues, allowing them in turn to increase the rate at which they can eliminate metabolic waste products.

Moreover, when a muscle relaxes, its fibers become spaced far enough apart so that the blood vessels have no problems transporting the volume of blood necessary to flush out metabolic wastes and replace them with oxygen and other nutrients, says Horay.

By maintaining a healthy muscle, he continues, not only can you relieve pain, but you can also *prevent* pain—as well as susceptibility to certain injuries. By relaxing the muscle with hot water, you also can prime it for stretching exercises, range of motion exercises and other gentle exercises that help strengthen and stretch the muscles out.

AN INSOMNIAC'S DREAM

As any spa owner will testify, spas are the perfect vessel for easing the stress of everyday life. But the soothing water action can do more than provide relaxation and pain relief.

According to Rosalind Cartwright, director of the Sleep Disorders Service and Research Center, sleep deepens as body temperature falls. As a result, she recommends in the newsletter *Bottom Line Personal* that people who suffer occasional sleeplessness – especially if it is induced by pain – can help themselves by soaking in water of about 103 degrees Fahrenheit approximately two hours before bedtime.

TOO HOT TO HANDLE

While spa use clearly has its benefits, there are some people to whom the physiological changes a spa causes can be too taxing.

As a result, medical and allied experts, including those interviewed by *P/SN* for the accompanying article, caution people with the following conditions to consult their physician before soaking.

High or low blood pressure: A doctor needs to determine in these cases whether or not the patient can withstand the sudden (albeit temporary) changes in blood pressure that hot water causes.

Heart disease: Many medical experts agree that the heart cannot handle the stress presented by the rise in blood pressure that comes with soaking in hot water, although recent studies see some benefit. The best advice, consult a doctor!

Lung disease or illness: This category includes patients with emphysema and bronchitis whose lungs would not be able to accommodate increased blood flow and heart rates.

HIV-positive blood: In advanced stages, these patients are generally too weak to withstand the hot water and its effects. (It should be noted that there is no medical evidence that the AIDS virus is transmitted through spa water!)

Multiple sclerosis: The muscle-weakening effects of the spa saps too much strength from these patients.

Thermal-nerve deficiency: This causes an inability of the sufferer to recognize when he or she is being burned or monitory their temperature.

Asthma or allergies: The sudden change in temperature may be hazardous for these patients.

Seizures: The effects of hot water may affect the brain in a way that could bring on seizures.

Diabetes: Soaking in a spa or hot tub can affect consumption of insulin, and the body may not be able to take the changes in activity within the body.

Pregnancy: Fetuses exposed to hot water in the first moth of pregnancy are more vulnerable to spinal bifida and other neural-tube defects.

Acute or new injury: In most cases, an injury is going to be swollen for a couple of days; this swelling indicates that there's quite a bit of blood circulation occurring in that area and hot water might serve to aggravate the injury.

Loss sensation: It's important that spa users be able to tell if they're too hot, so people who have a loss of feeling should consult with their doctor before soaking.

Patients with certain other conditions should also consult practitioners before using a spa, including those with vascular disease, kidney disease, open wounds or pressure sores, skin infections or contagious rashes, acute fever or impaired balance, in addition obesity and incontinence can be factors precluding spa use.

It should also be noted that discretion should used in deciding whether infants should soak at all because their bodies are not yest sufficiently developed to regulate their own temperature.

An, of course, users need to be warned not to use the spa after taking prescription drugs that affect the body's heart rate, blood pressure or its ability to regulate temperature.

Finally, those who are using alcohol (or recovering the morning after) should stay away from spas. Alcohol and certain drugs have several of the same effects on the body as hot water, thus amplifying the effects of both; at the same time, those substances impair the body's temperature regulating mechanisms.