

Health Benefits of Sauna

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Introduction

The use of heat while bathing has been an integral part of many cultures for centuries. Finland is well known as a society of avid users of the sauna, which usually produces a relatively dry heat between 70 – 100 degrees Celsius. The traditional Finnish sauna is a smoke sauna (“savusauna”) where stones are heated with a fire for several hours and then the sauna is taken after much of the smoke has cleared from the sauna building. More commonly today, saunas are heated by stoves using wood or electricity, and water is used intermittently on the stones to produce steam.

Other cultures known for their heat bathing traditions include Russia (Banya), Lithuania (Pirtis), Sweden (Bastu), and Turkey (Hammam). Here in the United States, the American Indians traditionally have used sweat lodges for spiritual ceremony. The rest of American sauna culture has been influenced by European immigration during the late 1800’s and early 1900’s. In my own case, for instance, I grew up in a northern Minnesotan town where many Finns immigrated in order to work in iron ore mines. Many of us therefore had saunas in our basements or at our lake cabins.

Sauna bathing usually involves several repetitions of alternating heat with cold, such as 15-20 minute heat exposures interrupted by dipping in a pond, taking a cool shower, or sitting outside. In some cultures, oak or birch twigs and leaves and/or steam are used to provide a more intense heating and massaging experience.

Health Benefits

There are many myths regarding the physiological and psychological affects of sauna bathing, yet unfortunately a lack of large, controlled studies in the medical literature to help fully understand the science supporting these myths. We have learned a significant amount

about the physiologic adaptations of the body to heat bathing, however, and there is a growing body of scientific study, especially from Germany and Finland, to help understand the real benefits and risks of the practice.

Physiologic Response

Essentially, the effects of heat bathing are the body's way to deal with heat stress. In other words, heat exposure causes a person's physiology to react to that form of stress out of self-defense in order to prevent injury. The systemic adaptations that occur over time can indeed make a person stronger, similar to adaptations to regular exercise.

Initially, as the body is exposed to the heat of a sauna, the skin temperature increases. As a way to dissipate the heat and protect the internal organs, the body decreases blood flow to those organs and increases circulation to the skin. In addition, sweat glands are stimulated in order to allow for evaporation and further cooling effect.

Because the blood volume to the periphery and skin is increased, the heart rate must also increase so that the internal blood pressure can be maintained. While the overall work of the heart does not change significantly, the pulse can increase up to double the normal rate.

Breathing becomes more rapid and shallow in the sauna, and the overall flow rate and lung capacity increases, suggesting more efficient pulmonary ventilation and allowing for additional heat dissipation.

The sympathetic nervous system is also stimulated as skin temperature rises, causing a "flight or fight" response. Stimulation of the hypothalamus and pituitary glands in the brain, which communicate with the adrenal glands near the kidneys, causes release of cortisol ("adrenaline"), creating a heightened sense of alertness, reduced perception of pain, and elevated mood. Interestingly, when a sauna is followed by a plunge into cold water, this adrenaline response is elevated even more.

Cardiovascular Benefits

There is good scientific data to support the beneficial effects of repeated sauna exposure for the heart. In particular, a person's resting systolic blood pressure can decrease as much as 10 points after just three 20 minute sauna sessions several days apart. Some studies have found up to a 20-point systolic blood pressure decrease with regular sauna exposure (such as twice per week) over a several month period.

Congestive heart failure, which is related to poor pump function of the heart, has also been shown to benefit from regular sauna exposure. Both symptoms and heart rhythm abnormalities improve predictably with regular sauna use.

Importantly, because the workload on the heart is generally not increased in the sauna, the risk of myocardial infarction ("heart attack") in the general population is not higher during sauna bathing. While it is usually recommended that a person who has had a cardiac event or procedure should wait at least 6 weeks before going back to sauna bathing, it is considered to be safe practice for people with heart disease.

Training Effect

Because many of the body's adaptations to sauna are similar to its response to exercise, many people wonder if taking a sauna can improve cardiovascular fitness. While one recent study has suggested that endurance performance does improve for runners who recover in the sauna after training, in general one's fitness does not improve with routine sauna bathing alone.

With regular sauna bathing, however, the body does adapt to heat stress, so that one can tolerate longer and hotter sauna exposures without injury. People who are new to saunas are therefore encouraged to moderate their heat exposure by limiting their time in the sauna, or by sitting on a lower bench. In addition, athletes who use the sauna routinely are able to exercise more efficiently and perform better in warm temperatures.

Respiratory Benefits

Part of the sympathetic nervous system response also relaxes smooth muscle in the bronchioles of the lungs, allowing for more efficient respiratory function. Patients with both asthma and chronic obstructive pulmonary disease generally report improved symptoms and ease of breathing while in the sauna, although longer-term studies have not generally shown an overall improvement in lung function with regular sauna use.

Musculoskeletal Benefits

During a sauna, joint synovial fluid becomes less viscous, allowing for improved joint mobility, and skeletal muscle is relaxed. These changes, along with the increased pain tolerance that one experiences, provides for a significant subjective decrease in musculoskeletal pain. Interestingly, for patients with rheumatoid arthritis and other autoimmune disorders, pain and inflammation have found to be increased on the day after taking a sauna – unless the sauna bath is followed by a cold immersion. For patients with arthritis that use cold-water bathing after sauna, there can be an overall improvement in symptoms.

Immune System

There are some studies that support the notion that regular sauna use stimulates the immune system. During a sauna session, white blood cells increase in the bloodstream, suggesting an elevation of the body's natural defense against illness. With routine sauna practice, at least one study has shown a decrease in the incidence of the common cold.

Psychological Benefits

One of the most common reactions to taking a sauna is that it simply seems to make people feel better. As it turns out, there are some measurable scientific reasons behind that.

Sauna exposure causes a significant release of Dopamine, a neurotransmitter, and Beta-Endorphin, a neuropeptide hormone. These substances cause a sense of euphoria, as well as improved mood, energy, sense of calm, and pain tolerance. (Endorphin is a combination of the words “ENDOgenous”, or occurring naturally in the body, and “moRPHINE”, a pain-relieving compound). The level of endorphins released during sauna bathing can be three times normal, similar to a

middle distance training run. This “runners’ high” that occurs can be somewhat addictive and may affect regular sauna users in the same way it affects regular exercisers.

Sleep is also improved after a sauna, with some research showing longer stage 4 sleep, which provides a deeper, more restful sleep and healthier dream activity. Sleep affects so many other aspects of health, including mood, immune function, and ability to handle stress, that this alone would seem to suggest a significant health benefit from regular sauna use.

The psychosocial aspects of group activity such as sauna bathing may also be an important part of the health benefits of sauna. Social connection, sharing with friends and feeling a part of a community, as well as the personal nature of conversation that is fostered in the sauna, all play parts in the cultural validity of group sweating that has existed in so many cultures over time. In addition, for those cultures that promote nudity in the sauna, a sense of equality and openness exists that one does not normally experience in every day life.

Risks

While quite safe if done in moderation, sauna bathing can present health risks.

Because the body uses sweat to help regulate core temperature during a sauna, dehydration can be a problem with excessive sauna use. Some athletes, such as wrestlers, have used the sauna for rapid weight loss through loss of water through sweat, and this has occasionally led to heat stroke and sudden cardiac death. When combined with the misuse of diuretic pills, this practice can be especially dangerous.

Alcohol consumption creates many potential risks for the sauna user. Alcohol counteracts the anti-diuretic hormone that the body normally secretes during heat stress in order to help the kidneys retain fluid. In addition, alcohol causes the peripheral blood vessels to become even more dilated than usual in the sauna, which can lead to rapid fall in blood pressure and cause falls or fainting. Alcohol also excites cardiac muscle and reduces coronary artery flow, increasing the risk of both arrhythmia and myocardial infarction.

Cold-water immersion is a common practice following sessions in the sauna. This causes rapid constriction of the skin blood vessels, which causes blood pressure to increase (as opposed to in the sauna where it remains stable). There is also a significant stimulation of the sympathetic nervous system, with rapid increase in adrenaline, heart rate, and also endorphins. Hence, the sense of euphoria and well being that one experiences following cold immersion intensifies that from taking a sauna alone.

Data is mixed regarding the benefit of cold immersion for muscular tissue following exercise, but there are several studies that support improved blood flow and more rapid recovery of muscular damage and soreness with cold immersion. As mentioned above, those with inflammatory conditions like rheumatoid arthritis demonstrate benefit with cold water immersion following sauna bathing.

Of concern however, is the fact that cold immersion can lead to cardiac arrhythmia and coronary artery spasm, making it potentially dangerous to those with heart disease. There are cold receptors in the face and scalp that respond to a rapid fall in temperature. This stimulates the “diving reflex”, which is a complex cardio respiratory reaction that causes apnea and a sense of shortness of breath, decreased cardiac output, and rapid decrease in pulse. Heart arrhythmias are common during this response, and can pose a danger to those prone to dangerous heart rhythms or at risk for heart attack.

As we can see, while people with heart disease can generally use the sauna safely, this is a population that should absolutely avoid alcohol before and during sauna bathing. In addition, these individuals should take extra caution when plunging in cold water to avoid exposing the face and head. A cool shower or slower cooling simply by sitting outside is generally considered safer practice for this group.

Conclusion

Sauna bathing causes the body undergo many physiologic changes in attempt to protect itself against heat stress. Some of those adaptations can provide health benefit, most notably to resting blood pressure. There also evidence to suggest improved function in other aspects of cardiac, respiratory, musculoskeletal, and immune function. Regular sauna use increases the ability for athletes to train or perform

in heat, and post exercise saunas may improve endurance. Many of the benefits of sauna bathing are psychological, including improved sleep, mood, and pain tolerance. Cold plunging following a sauna can accentuate some of these benefits, but caution is advised regarding immersion of the face and head. Alcohol use before and during the sauna is also ill advised, as is the practice of using the sauna for rapid weight loss. Otherwise, sauna bathing is considered very safe and regular use can benefit overall physical and mental health.

(Dr. Mark Timmerman is a Family Physician and Sports Medicine Specialist in Wisconsin, USA. He has a wood heated sauna in his home and takes a sauna at least three times each week.)