Deutsche Sauna-Akademie	**Deutsche Sauna-Akademie**
Titel	Is a Cold Plunge Necessary After Sauna?
Subtitel	Why cooling matters—but an ice bath or plunge pool is not required
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Short answer: No. Cooling is an essential part of a complete health-oriented sauna procedure, but a cold plunge is not physiologically required. After sauna, the body has stored heat, skin blood flow is elevated and sweating may continue. Cooling helps remove this heat and supports the transition toward thermal and circulatory recovery. This can be achieved with cool air, a shower, progressively colder water or immersion. Water cools more rapidly than air, and immersion exposes a larger body surface at once, but these differences describe cooling intensity—not a requirement for a particular method. Very cold immersion also adds a distinct cold-shock and cardiovascular stimulus. The appropriate goal is sufficient, controllable cooling, not maximum cold.

The cold plunge has become one of the most recognisable images associated with sauna. This can create the impression that sauna bathing is incomplete unless the bather enters a pool of very cold water immediately after leaving the hot room.

Physiologically, that conclusion does not follow. What the body needs after a substantial heat exposure is cooling and recovery. A plunge pool is one effective way of accelerating cooling, but it is only one method among several.

> **Cooling is part of the sauna procedure. A cold plunge is one cooling method—not the definition of cooling.**

Why is cooling part of sauna bathing?

During the heat phase, skin and core temperature rise, skin vessels dilate, skin blood flow increases and sweating begins. The body therefore leaves the sauna with stored heat and a circulation still adapted to heat dissipation.

The cooling phase reverses this trajectory. Environmental heat gain stops, skin temperature falls, heat can leave the body and cutaneous blood flow progressively decreases.

Without adequate cooling, some of the thermal load from one heat phase is carried into the next. Cooling is therefore part of thermal-dose control, not merely a traditional ritual.

Does cooling have to mean cold water?

No. Heat can be lost through radiation, convection, evaporation and conduction. Leaving the sauna and entering cooler air already changes the heat balance substantially.

A shower adds much more efficient conductive and convective heat transfer because water removes heat from the skin far faster than air. Immersion exposes an even larger surface simultaneously and adds hydrostatic effects.

These are differences in rate and physiological intensity. They do not establish a biological requirement for immersion.

What does a cold plunge do particularly well?

Immersion cools a large proportion of the skin at the same time. Because water transfers heat efficiently, skin temperature falls rapidly. If the water is substantially colder than the skin, cutaneous vasoconstriction also occurs rapidly.

The result is a strong and efficient cooling stimulus. This can be useful when substantial heat has been stored or when another sauna round follows.

But efficiency should not be confused with necessity. A method can be faster without being the only physiologically valid method.

What does the newest sauna research show?

A 2026 crossover study provides a particularly useful comparison. Sixteen healthy adults completed two 15-minute sauna bouts at 85 °C. Between bouts they cooled for 10 minutes in 23 °C air, either with or without an additional 90-second whole-body immersion in 20 °C water [1].

The water immersion clearly improved cooling. At the end of the second sauna bout, mean core temperature was 37.55 °C with water cooling compared with 38.03 °C after air cooling alone. Heart rate was also lower: 108 versus 125 beats per minute [1].

This demonstrates that water immersion can materially reduce the thermal load carried into the next sauna exposure. It does not demonstrate that immersion is required for safe or effective sauna bathing.

> **Evidence that immersion cools more effectively is not evidence that every bather needs a plunge pool.**

An important detail: the water was 20 °C

The study is also useful because the immersion water was 20 °C—not ice water. A substantial physiological cooling effect was achieved without an extreme cold stimulus [1].

This undermines a common assumption that effective post-sauna cooling requires the coldest possible water. The temperature gradient must be sufficient to remove heat; it does not have to maximise cold shock.

What can a shower achieve?

A shower provides direct water cooling while allowing the bather to control temperature, duration and exposed area. Cooling can begin at the extremities and progress across the body rather than exposing most of the skin simultaneously.

Classic Finnish experiments compared sauna followed by a 15 °C shower, sauna followed by ice-water immersion and sauna followed by room-temperature recovery. Both cool and cold exposures altered the circulation relative to heat alone [2].

A shower is therefore not a second-rate substitute for a plunge. It is a different cooling dose with greater opportunities for individual control.

What does cool air achieve?

Cool air stops the large environmental heat gain of the sauna and permits continued heat loss through convection, radiation and evaporation. Because air transfers heat less effectively than water, cooling is slower.

Slower does not mean ineffective. For a modest preceding heat load, sufficient time in cooler air may contribute substantially to recovery. It can also serve as a useful transition before water cooling.

The required cooling depends on how much heat has actually been stored, not on adherence to a fixed ritual.

Why is a plunge physiologically different from a shower?

The distinction is not just temperature. Whole-body immersion cools a large skin area simultaneously. Hydrostatic pressure also shifts blood from the limbs toward the central circulation.

A shower lacks this whole-body hydrostatic effect and usually allows a more gradual change in skin temperature. A plunge therefore creates a different cardiovascular stimulus even if the water temperature were identical.

What happens to the circulation?

Sauna heat dilates the cutaneous circulation and reduces peripheral vascular resistance. Cold water reverses part of this response through vasoconstriction, which raises peripheral resistance.

Classic sauna experiments found decreased total peripheral resistance during sauna and increased resistance during cold exposure. Alternating heat with cold or cool water produced greater cardiac strain than sauna followed by room-temperature recovery [2].

This is an important reason not to describe the plunge as merely 'refreshing'. It is a physiologically active intervention.

Does cold water raise blood pressure?

Cold-induced vasoconstriction can increase arterial pressure. A 2024 systematic review and meta-analysis found a small overall increase in mean blood pressure after cold exposure in healthy participants, while average heart rate decreased slightly and several indices of parasympathetic activity increased [3].

Responses depend on technique, temperature, timing and the individual. The cardiovascular effect of a brief moderate shower cannot simply be equated with abrupt whole-body immersion in very cold water.

What is the cold-shock response?

Sudden immersion in sufficiently cold water can provoke an inspiratory gasp, hyperventilation, sympathetic activation, tachycardia and an increase in blood pressure. This immediate response is known as the cold-shock response [4,5].

Its magnitude depends particularly on the rapid fall in skin temperature and the amount of skin exposed. Repeated exposure can produce partial habituation, but habituation does not make extreme cold physiologically neutral [6].

> **A cold plunge is not simply 'more cooling'. At sufficiently low temperatures it becomes an additional stressor.**

Is colder always better?

No. Lower water temperature increases the potential heat-transfer rate, but it also increases sensory, respiratory and cardiovascular stress.

Once sufficient heat has been removed for the intended recovery, making the water still colder does not automatically improve the sauna procedure. It changes the physiological dose.

Health-oriented practice therefore separates the objective—cooling—from the intensity of the method used to achieve it.

Does an ice bath cool the core immediately?

Not necessarily. Skin temperature responds much faster than deep body temperature. In classic sauna experiments, brief ice-water immersions produced dramatic surface cooling without substantially disturbing the thermal balance of the body core [7].

A person can therefore feel extremely cold while still retaining heat in deeper tissues. Subjective cold sensation is not a precise measure of complete thermal recovery.

This is another reason why maximum cold sensation should not be used as the endpoint of cooling.

Do you have to close the pores?

No. Human skin pores do not open during sauna and close under cold water like mechanical valves. Heat changes skin blood flow and sweating; cold changes vascular tone and skin temperature.

The traditional phrase 'closing the pores' may describe the sensation of cold skin, but it is not an anatomical explanation for why cooling is useful.

Does a plunge strengthen the immune system?

Cold exposure produces measurable autonomic, endocrine and metabolic responses. That does not establish that a post-sauna plunge is required to 'strengthen immunity'.

Claims about immune benefit require separate clinical evidence. The physiological justification for cooling after sauna is much simpler and better established: remove excess heat and support recovery.

A possible effect of repeated cold exposure should not be turned into a compulsory component of sauna bathing without evidence.

Does the plunge make the sauna healthier?

There is no basis for a simple rule that sauna plus ice water is healthier than sauna plus adequate moderate cooling. A stronger contrast produces a stronger stimulus, but stimulus magnitude and health benefit are not synonyms.

The relevant question is whether the total heat-cold procedure is appropriate for the person and the purpose. For some bathers, an invigorating plunge is enjoyable and well tolerated. For others, a progressive shower is the more appropriate method.

What about cardiovascular disease?

Abrupt cold immersion deserves particular caution when cardiovascular reserve is limited. Cold vasoconstriction raises peripheral resistance and can increase blood pressure, while immersion shifts blood centrally.

The cold-shock response can also create substantial autonomic stimulation. Reviews of cold-water immersion discuss both possible benefits and important hazards, emphasising that effects depend strongly on circumstances [5].

A person who tolerates sauna heat well does not automatically tolerate extreme cold equally well.

Can the face and head be immersed?

Facial cooling and breath holding can activate the diving response, which differs from the sympathetic cold-shock response. When powerful sympathetic and parasympathetic drives occur simultaneously, an autonomic conflict may arise and can promote cardiac arrhythmias in susceptible circumstances [8].

This is one reason why abrupt head-first or breath-hold immersion should not be treated as a routine requirement of sauna cooling.

Which cooling method is best?

There is no universal best method independent of context. The choice depends on the preceding thermal dose, the bather's health and preference, whether another heat phase follows, and the available facilities.

Cool air offers gradual recovery. A shower provides efficient but controllable water cooling. Moderate immersion cools a large surface quickly. Very cold immersion adds a pronounced cold stimulus.

The methods can also be combined—for example, cooler air followed by a shower, with optional immersion for a person who wants and tolerates it.

A useful hierarchy of cooling intensity

Cooling can be thought of as a continuum rather than an all-or-nothing choice. At one end is passive cooling in cooler air. Next comes a temperate or cool shower, followed by progressively colder water and increasing body-surface exposure. Whole-body immersion produces a stronger and more uniform stimulus, while ice-cold immersion sits toward the extreme end.

This framework is more physiologically useful than dividing sauna bathers into those who 'do' or 'do not' use a plunge.

How much cooling is enough?

There is no single temperature or duration that defines complete recovery for everyone. Skin temperature, core temperature, heart rate, subjective thermal comfort and the planned next activity all matter.

If another sauna round follows, sufficient cooling reduces the amount of residual heat carried into it. The 2026 experiment demonstrates this directly [1]. If the sauna session is finished, the goal is comfortable continued recovery without unnecessary thermal or cardiovascular stress.

A person who is still markedly overheated and sweating heavily after a very brief superficial cooling has probably not completed the recovery process simply because the skin felt cold for a moment.

What is the health-oriented approach?

A health-oriented sauna procedure treats heating, cooling and recovery as parts of one controlled thermal sequence. None should be maximised for its own sake.

The heat phase should provide an appropriate thermal stimulus. The cooling phase should remove the resulting heat. The recovery phase should allow thermal and circulatory conditions to stabilise before another exposure.

Within this model, a cold plunge is an optional tool. The requirement is adequate cooling, not a particular piece of equipment.

> **The physiological requirement is cooling. The plunge pool is optional.**

So, is a cold plunge necessary after sauna?

No. A plunge pool can provide rapid and effective cooling, and moderate immersion can meaningfully reduce thermal strain before a subsequent sauna round. But neither physiology nor current evidence establishes whole-body cold immersion—still less ice-water immersion—as a mandatory component of sauna bathing.

Cool air, showers and other appropriately dosed cooling methods can all contribute to restoring thermal balance. The method should be selected according to the thermal load, the individual and the intended sauna sequence.

The traditional plunge can remain an enjoyable and culturally valuable part of sauna. It does not need to become a biological rule.

Conclusion

Cooling is an integral component of health-oriented sauna bathing because the body leaves the hot room with elevated skin and core temperature, an expanded skin circulation and continuing thermoregulatory activity.

Water accelerates cooling, and immersion is especially efficient because it exposes a large body surface simultaneously. Yet stronger cooling also creates stronger vasoconstriction, haemodynamic change and—at sufficiently low temperatures—a cold-shock response.

The scientifically defensible conclusion is therefore simple: cool down after sauna, but choose the cooling method and intensity appropriately. A cold plunge is one option, not a requirement.

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Editorial note: This article distinguishes the physiological need for post-sauna cooling from the optional use of cold-water immersion. It is intended for scientific and educational information; individual tolerance and cardiovascular health should guide the intensity of cold exposure.