Deutsche Sauna-Akademie	**Deutsche Sauna-Akademie**
Titel	What Does Fanning Actually Do During an Aufguss?
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Short answer: Fanning does not create heat. It controls where and how quickly the heat and water vapour already present in the sauna reach the skin. A thin boundary layer of warm, humid air normally forms next to the body and resists heat and mass transfer. Moving air thins or repeatedly replaces this layer. In cooler, dry conditions this can increase evaporation and feel cooling. During a hot, humid Aufguss, however, the replacement air may be hotter than the skin and rich in water vapour. Convection can then deliver more heat while the capacity for sweat to evaporate remains restricted. Direction, air velocity, distance, pulse duration, towel or fan geometry, bench height and local humidity therefore determine the intensity of a fanning stroke. Professional fanning is not simply air movement or showmanship. It is controlled heat-flow management.

When a sauna master swings a towel or fan, guests often describe the result as a wave of heat. The obvious interpretation is that the towel somehow produces additional heat. It does not.

The energy is already present in the sauna: in the hot air, the hot surfaces and, after water has been applied to the stones, in the hot humid air mass. Fanning changes transport. It redistributes that air, increases local air velocity and alters the thin layer of air immediately next to the skin.

This makes fanning one of the most underestimated dose variables in an Aufguss.

1. Fanning is a heat-transfer intervention

A towel, fan or flag is mechanically simple: it accelerates and redirects air. Physiologically, however, this changes several processes simultaneously.

- convective heat transfer between air and skin;
- transport of water vapour toward and away from the skin;
- thickness and renewal of the skin's boundary layer;
- evaporation of sweat;
- local condensation conditions when humid air contacts cooler skin;
- distribution of fragrance molecules;
- the spatial and temporal pattern of thermal sensation.

The Academy's teaching material therefore treats air movement as a direct thermal dose variable rather than an accessory to the ritual. □filecite□turn13file0□

2. The invisible boundary layer

Air directly touching the body does not behave exactly like the freely moving air farther away.

A thin boundary layer develops at the skin. Its temperature, humidity and velocity differ from the bulk cabin air. Heat and water vapour must cross this layer before they can be exchanged with the room.

In engineering terms, the layer acts as a resistance to heat and mass transfer. A thicker, more stable boundary layer generally reduces exchange; moving air makes the layer thinner or continually replaces it.

This is why the same cabin can feel dramatically different when the air is still and when a sauna master begins to fan.

3. What a towel stroke actually changes

A towel stroke generates a moving air mass. When that air reaches the bather, local air velocity rises. The boundary layer is disturbed and replaced more rapidly by cabin air.

The resulting change in heat transfer depends on what kind of air arrives.

If the incoming air is cooler and dry, it may increase cooling. If it is much hotter than the skin, convection can transfer heat toward the body. If it is also humid, the ability of sweat to evaporate can simultaneously be reduced.

The same physical act—moving air—can therefore cool or heat depending on environmental conditions.

4. Why wind cools outdoors but can heat in a sauna

Everyday experience teaches that moving air feels cooler. That intuition is correct in many ordinary environments because air temperature is below skin temperature and moving air accelerates both convection away from the skin and evaporation.

A sauna reverses an important temperature gradient. Cabin air can be far hotter than the skin.

Under these conditions, increasing air movement can increase convective heat transfer from the air toward the skin rather than away from it.

This is the physical reason why 'wind chill' intuition cannot simply be transferred to the sauna.

5. Convection: direction matters

Convective heat transfer can be represented conceptually as:

$q_{conv} = h_c \times A \times (T_{air} - T_{skin})$

Here, q_{conv} is convective heat flow, h_c is the convective heat-transfer coefficient, A is exposed area, and the temperature difference determines the direction of transfer.

Air movement generally increases h_c. When T_{air} is higher than T_{skin}, increasing h_c increases heat flow toward the skin.

The formula is useful conceptually, but a sauna master does not need to calculate watts during an Aufguss. The practical message is enough: hotter air plus faster air movement can mean faster heat delivery.

6. Fanning also changes mass transfer

Heat is only half of the problem. Water vapour also moves across the boundary layer.

Sweat can cool the body only when it evaporates. Evaporation depends partly on the water-vapour pressure difference between wet skin and the surrounding air.

Moving air can remove humid air from the skin and increase evaporation when the surrounding air is sufficiently dry. This is why a breeze can be powerfully cooling in ordinary conditions.

During Aufguss, however, the replacement air may itself have a high water-vapour pressure. Boundary-layer renewal then does not necessarily restore a strong evaporation gradient.

7. The dry-air case

Imagine a hot but relatively dry sauna before water is poured onto the stones.

The skin is sweating. Air immediately next to the wet skin becomes more humid. Gentle air movement removes some of that humid boundary-layer air and replaces it with drier cabin air.

This can support evaporation even though the incoming air is hot.

Two processes therefore compete: convection may add heat because the air is hotter than the skin, while enhanced evaporation may remove heat.

Which effect dominates depends on temperature, humidity, skin wetness and air velocity.

8. The humid-Aufguss case

Now add water to the stones.

The cabin's water-vapour pressure rises. The incoming air delivered by fanning is no longer merely hot; it is hot and humid.

Convective heat transfer can increase because air velocity is higher. At the same time, the vapour-pressure gradient that drives sweat evaporation is reduced.

The bather therefore loses part of the cooling benefit that moving dry air might otherwise provide.

This combination explains why a towel stroke after Aufguss can feel disproportionately intense.

9. Fanning and condensation

If local humid air has a dew point at or above the cooler skin-surface temperature, water vapour can condense.

Condensation releases latent heat at the surface. Air movement can influence this process by continually replacing air near the skin and transporting humid air toward it.

However, condensation should not be presented as the sole explanation of the fanning effect. Its magnitude is dynamic and depends on local vapour pressure, skin temperature and airflow. Recent sauna research suggests that humidity as a whole is a clearer determinant of physiological response than a simple condensation-potential index.

The defensible conclusion is that fanning can alter condensation conditions, but convection and restricted evaporation remain central mechanisms.

10. The 'heat wave' is a transport wave

The familiar wave of heat after a towel stroke is best understood as a rapid change in local transport conditions.

Within seconds, the skin encounters a different combination of air velocity, air temperature and vapour pressure.

The towel has not generated thermal energy. It has delivered an existing hot, humid air mass more effectively to the bather.

A useful formulation is:

Fanning does not create the heat wave. It creates the transport wave.

11. Why little water plus strong fanning can feel hotter

Water quantity alone does not determine Aufguss intensity.

The Academy's existing thermal model explicitly notes that an Aufguss using relatively little water but vigorous air movement can feel more intense than a water-rich Aufguss with slow, broadly distributed airflow. □filecite□turn13file5□

This is an important correction to the common assumption that the ladle is the principal intensity control.

Water determines part of the humidity stimulus. Fanning determines how that altered air is distributed and how strongly it interacts with the skin.

12. Global distribution versus directed pulses

Not all fanning techniques produce the same exposure.

Broad, slow movements can redistribute warm humid air through a larger cabin volume. Their purpose may be to homogenise the room or move the löyly cloud downward from the ceiling.

Directed towel strokes create narrower and faster air jets. They can generate a pronounced local thermal pulse on one guest or one body region.

The first technique primarily changes room distribution. The second can strongly change local heat flux.

13. Local load is not the same as whole-body load

A powerful directed stroke may feel extreme on the shoulders or face while the rest of the body experiences a smaller change.

This distinction matters because subjective intensity is strongly influenced by where the stimulus lands.

A local heat pulse can therefore dominate perception without implying that whole-body core temperature has changed by the same magnitude.

Professional fanning should distinguish local intensity from total thermal dose.

14. Why the head and upper body are especially sensitive

The upper body is often exposed to hotter air because sauna temperature rises with height. Directed air also commonly reaches the face, shoulders and upper chest first.

These regions contribute strongly to thermal sensation and discomfort. A sudden hot humid air pulse toward the face can also alter breathing sensation and create an immediate urge to turn away.

The Academy's thermophysiology material therefore notes that direct air toward the head and upper chest is often perceived more strongly than air directed toward the back or legs. □filecite□turn13file2□

15. Distance matters

A directed air jet loses coherence and velocity as it travels and mixes with surrounding air.

A stroke delivered close to a guest can therefore create a different local peak from the same movement performed farther away.

Distance also changes the area over which the impulse is distributed. Close, narrow, fast air delivery tends to concentrate the stimulus; broader delivery at greater distance can distribute it more gently.

There is no universal 'safe distance' in metres because towel size, movement, cabin geometry and air velocity differ. Distance is a dose-control variable, not a fixed rule.

16. Speed matters—but not by itself

Increasing towel speed can increase air velocity, but the relationship between arm movement and the air velocity reaching a guest is not simple.

Towel area, shape, stiffness, folding, stroke path and angle all affect how much air is displaced and where it goes.

Two visually similar strokes can therefore create different airflow fields.

For training, the relevant question is not 'How fast did the towel move?' but 'What air movement reached the guest?'

17. Surface area and tool geometry matter

A large towel, small towel, fan, flag or other fanning tool couples differently to the air.

A large surface can displace a substantial air volume with a relatively slow movement. A smaller or differently shaped tool may generate a narrower or faster jet.

This means technique cannot be judged only by visual choreography. The same movement pattern with a different tool may produce a different thermal effect.

18. Pulse duration matters

A very brief directed stroke creates a short local peak. Repeated strokes or sustained airflow extend the period during which the boundary layer remains disrupted.

Duration therefore changes the thermal dose even when peak air velocity is identical.

This is analogous to other sauna variables: intensity and time must be considered together.

19. Repetition matters

The first strong towel stroke occurs on a body already warmed by the sauna. The next occurs after the boundary layer, skin wetness and local thermal sensation have changed.

A sequence of strokes can therefore accumulate local strain even if each individual movement is technically identical.

Three rounds of progressively stronger fanning are not three independent events. They are successive interventions in an already changing thermal system.

20. Bench height changes the starting condition

The same directed stroke can feel different on the upper and lower benches.

Higher positions generally expose bathers to hotter air and often to the humid löyly layer sooner. Fanning from this hotter region toward guests can transport a more intense air mass.

Technique should therefore be adapted to cabin geometry rather than copied mechanically from one sauna to another.

21. Cabin geometry is part of the technique

Ceiling height, heater position, bench arrangement, ventilation and room shape determine the natural convective circulation of the sauna.

Fanning interacts with this existing flow field.

A technique that efficiently distributes löyly in one cabin may create uneven hotspots or weak circulation in another.

Professional competence therefore includes reading the room, not merely reproducing named towel movements.

22. Fanning and fragrance

Air movement also transports volatile fragrance compounds.

This can improve distribution, but it can also create local peaks in the breathing zone. The Academy's essential-oil guidance therefore treats strong direct fanning as relevant not only to thermal load but also to fragrance and mucosal exposure. □filecite□turn13file6□

Thermal and olfactory intensity should not automatically be maximised at the same moment.

23. The sauna master's control variables

From a thermal perspective, fanning can be described through several controllable variables:

- air velocity reaching the guest;
- direction of the airflow;
- distance from the guest;
- area over which the airflow is distributed;
- duration of each pulse;
- number and repetition rate of pulses;
- tool surface and geometry;
- position relative to the hot humid air layer;
- timing after water application;
- bench height and guest position.

Together, these variables determine the local exposure far more precisely than labels such as 'soft', 'medium' or 'strong' alone.

24. Why fanning is a safety-relevant skill

A sauna master can alter guest exposure within seconds without changing the heater setting or adding more water.

That makes fanning unusually powerful as a dose-control instrument.

The Academy's load model describes air movement as a 'dose amplifier': strong movement removes the local buffer layer, directs hot humid air to the skin and can create a pronounced load peak. □filecite□turn13file8□

This also means that poor fanning is not merely an aesthetic problem. It can be a load-management problem.

25. Stronger does not mean more skilled

The ability to produce a hard air pulse is technically easy to recognise, which may explain why strength is sometimes mistaken for competence.

Professional skill is more demanding. It means being able to produce different airflow patterns intentionally, predict their effect, observe the guests and stop escalation before the stimulus becomes uncontrolled.

The Academy's formulation is therefore deliberately different:

Fanning technique is the art of using air movement so that heat flow is guided rather than allowed to become uncontrolled. □filecite□turn13file2□

26. Progressive dosing

A controlled Aufguss does not need to begin with maximum airflow.

Broad distribution can establish the room climate. Moderate impulses can then make the changed humidity perceptible. More directed strokes can be used selectively if the group remains comfortable and adequate reserve remains.

This creates a progression that is thermally intelligible rather than merely dramatic.

Importantly, the final round does not physiologically have to be the strongest. The guests are already hotter and their remaining safety reserve may be smaller.

27. Guest behaviour provides feedback

The sauna master cannot directly measure every guest's skin heat flux or core temperature. Behaviour therefore becomes an important observational signal.

Turning away from the airflow, shielding the face, moving down a bench, repeatedly looking toward the door, sudden restlessness, changes in breathing or early departure can indicate that local intensity is becoming difficult to tolerate.

These observations are not diagnostic measurements, but they are relevant operational feedback. The Academy's thermophysiology material specifically identifies such early behavioural warning signs during Aufguss peaks. □filecite□turn13file2□

28. A simple physical model

The effect of fanning can be summarised as a sequence:

TOWEL / FAN MOVEMENT → AIR VELOCITY ↑ → BOUNDARY LAYER THINS / RENEWS

Then the environmental conditions determine the result.

DRIER / COOLER AIR → evaporation may increase + convective cooling may increase

HOTTER / HUMID AIR → convective heat gain may increase + evaporation remains limited + condensation conditions may be enhanced locally

During Aufguss, the second pathway often becomes increasingly important.

29. Fanning as part of total thermal dose

Fanning should not be assessed in isolation.

Its effect depends on the heat already stored in the body, cabin temperature, water quantity, vapour pressure, duration of the warm phase and previous Aufguss rounds.

A strong stroke early in a mild session is not equivalent to the same stroke after twelve minutes of heating and two previous humidity peaks.

This links fanning directly to the Library's broader concepts of thermal dose, safety reserve, session duration and cumulative load.

30. What should be measured in future research?

Surprisingly little sauna research quantifies fanning as an independent exposure variable. This leaves a useful field for future experimental work.

A rigorous study could simultaneously measure local air velocity, air temperature, water-vapour pressure, skin temperature, heat flux, skin wetness, heart rate and subjective thermal sensation at several bench positions.

Different tools, distances and stroke patterns could then be compared under otherwise identical Aufguss conditions.

Such work would move fanning science from qualitative experience toward reproducible thermal dosimetry.

31. The professional principle

The central mistake is to treat fanning as decoration added after the 'real' Aufguss.

Water application changes the humidity field. Fanning determines how that field is transported toward the guests.

Both are therefore part of the thermal dose.

The most concise professional statement is:

Fanning is heat-flow control.

Conclusion

Fanning during an Aufguss is a physical intervention at the interface between sauna climate and human skin.

By increasing air velocity, it thins or renews the boundary layer that normally resists heat and water-vapour transfer. In dry conditions this may support sweat evaporation. In hot humid conditions, the same mechanism can deliver more convective heat while evaporative cooling remains restricted. Directed

airflow can additionally create intense local peaks whose magnitude depends on velocity, distance, direction, duration, tool geometry, bench height and cabin airflow.

The towel does not create heat. It controls transport.

This is why fanning should be taught not only as choreography, tradition or show technique, but as thermal-dose management.

The guiding principle is:

A skilled sauna master does not maximise air speed. A skilled sauna master controls where, when and how strongly heat reaches the guest.

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Editorial note: The fundamental heat- and mass-transfer mechanisms described here are well established. However, direct experimental studies quantifying towel- or fan-generated airflow during real sauna Aufguss are limited. Statements about the relative effects of specific fanning techniques should therefore be understood as physics-based and practice-based interpretations unless directly measured. No universal safe air velocity, distance or number of strokes has been established for sauna fanning.