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## Sauna in patients with hypertension

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### Abstract:

Saunas are very popular around the world, especially in some specific regions like Finland. Sitting in a temperature of 45-110°C with intervals often including cold baths influence our bodies in different aspects. Apart from being an addition to asthma or depression treatment, it works well as prevention of heart diseases and hypertension. Sauna is also believed to be able to reduce increased blood pressure values. Because of its safety it can be easily prescribed for all patients without few contraindications.

**Key words:** sauna; hypertension; blood pressure

### **Introduction:**

Saunas by definition are small rooms or huts used for dry or wet heat sessions. The temperature that is crucial for such experience comes from either steam produced by a furnace located in the facility or devices emitting infrared radiation. According to that difference, we can divide saunas into separate types like smoke, steam or infrared sauna. Since that kind of spending spare time is quite popular in many countries around the world, also its process may vary depending on the region. For example in Finland saunas are common in households while in Japan public places are more popular.

Their impact on health has been already widely examined. It is said that saunas can bring relieve in some diseases like autoimmune inflammatory diseases affecting the joints, for example rheumatoid arthritis or ankylosing spondylitis. While some studies decline their impact on objective measures of RA (rheumatoid arthritis) [1], other report significant drop of pain, stiffness and fatigue when the beginning and the end of the treatment are compared [2]. After all, none of them points any harmful effects, so sauna can be used as a method to relieve patients' discomfort. Further listed disorders are pulmonary obstructive disorders like asthma, chronic bronchitis or obstructive pulmonary disease. Hannuksela et al. states that sauna can increase both static and dynamic spirometric parameters of the lungs (VC=Vital Capacity, TV=Tidal Volume, minute ventilation, FEV=Forced Expiratory Volume). What is more, patients with asthma, chronic bronchitis or obstructive pulmonary disease reported improvement in breathing after adding sauna into their rehabilitation programme [3]. Large study carried out on a cohort of 1935 Caucasian men by Kunutsor et al. demonstrated reduced risk of chronic and acute respiratory diseases among people without such diseases at the beginning of the study. Hazard ratio of respiratory diseases in groups taking 2-3 and  $\geq 4$  baths per week in comparison to control group taking  $\leq 1$  were 0,66 and 0,49. What is more, similar scores were obtained in models including other factors like physical activity, years of school, energy intake etc. [4]. Sauna is also used to treat neurological and psychological disorders. Studies from Japan and New Zealand showed reduced headache intensivity and reduced anger in patients with chronic headache after sauna therapy. Improvement was also noticed in patients with depression. They had improved somatic complaints, relaxation scores and hunger scores [5, 6].

Despite all of these examples, sauna is mostly associated with cardiovascular system. What is interesting, some of its disorders are listed as indications, while other as contraindications even though they are similar to each other. As an example severe aortic stenosis, unstable angina pectoris and recent myocardial infarction are typically contraindications [7]. Patients with arrhythmias or decompensated heart failure have relative contraindications but those with stable coronary heart disease should be safe. Furthermore, studies carried out in Finland have not shown any relationship between sauna bathing and myocardial infarction. It is not even linked with reinfarction or sudden death [3]. Laukkanen et al. examined the hazard ratio of fatal cardiovascular disease (CVD) in men. The results were 0,71 (0,52 to 0,98) and 0,30 (0,14 to 0,64) for men taking 2-3 and 4-7 baths a week compared to men taking only one bath per week. It shows that sauna strongly reduces the risk of fatal CVD event in middle-aged or elderly people [8].

Hypertension is described as a chronically elevated blood pressure in arteries. It is diagnosed if the value of systolic blood pressure is  $\geq 140$  mmHg and/or diastolic blood pressure is  $\geq 90$  mmHg. According to WHO this problem affects about 1,13 billion people around the world becoming one of the most common diseases of affluence [9]. Its after-effects are the reason of about 12,8% deaths worldwide [10]. Because of its various reasons,

hypertension can be classified as primary or secondary disease. Likewise risk factors are very diverse. The best known are probably excess body weight, too much salt in a diet, smoking, alcohol and lack of exercise. Genes are also considered as an important aspect of developing hypertension [11]. The disorder is often downplayed by patients unaware of its serious complications. Heart diseases, strokes, chronic kidney disease or impaired vision are only a few examples [12]. If it is not treated well it can lead straight to patient's death. This is why the search for new methods of well tolerated treatment is needed.

### **Description of knowledge:**

The very first step of hypertension management are changes in lifestyle. Taking up physical exercise, altered dietary habits, quitting smoking or reducing alcohol are crucial for efficient therapy. Patients often require pharmaceutical treatment as well. However selection of drugs for a specific patients is difficult and needs time and observation. Therefore additional ways of decreasing blood pressure are still wanted. Sauna is believed to be safe and accessible alternative. Hannuksela et al. does not mark differences in hemodynamics between healthy people and hypertensive patients [3]. Also Kukkonen-Harjula and Kauppinen did not find any risk for people at all ages, even children [13].

In a research carried out by Zaccardi et al. on 1621 Finnish men a correlation between frequency of taking sauna baths and episodes of hypertension was examined. Median time of observation was 24,7 years. In this time 251 events occurred. When compared to participants taking only one bath per week, those taking 2-3 had hazard ratio of 0,76. Men who used sauna 4-7 times a week had it even lower with a value of 0,54. Adjustment for factors like glucose, creatinine, alcohol intake etc. did not alter these rates much (0,83 and 0,53 respectively). This shows that sauna sessions highly reduce the risk of developing hypertension. Increasing their amount enhances that effect [14]. Another study led by Laukkanen et al. gathered data of 102 patients (56 male and 46 female). 63% of them had dyslipidaemia and 14% had hypertension. They were tested after 30 minutes long sessions with two-minute cold shower during the break between fifteen-minute halves. Researches show lower scores of PWV (pulse wave velocity), AIx (augmentation index) or diastolic time. First two remained dropped even after 30 minutes. Also blood pressure was reduced. Systolic blood pressure dropped from mean 136,5 mmHg to 130,3 mmHg right after the session and stopped at 129,8 mmHg after 30 minutes. Diastolic blood pressure was 82,1 mmHg, 75,1 mmHg and 80,6 mmHg respectively [15]. Both studies indicate positive influence of heat on blood pressure values and arterial compliance.

There are also many studies looking for connection between exercise and sauna baths. Gayda et al. enlisted a group of 16 adults (13 men and 3 women) eight of whom had stage I hypertension and the rest was prehypertensive. All of them were not treated for hypertension. Both 24-hour ABPM and acute blood pressure at baseline, 15 and 120 minutes were measured. Results demonstrated a set of exercise and sauna as the most efficient. Mean SBP and DBP (systolic blood pressure and diastolic blood pressure) for a control group at baseline was 134/85 mmHg and for sauna group it was 136/86 mmHg. At 15 minutes it was 135/83 mmHg and 136/85 mmHg and at 120 minutes these values jumped to 142/84 mmHg and 139/84 mmHg. Sauna and exercise group showed values of 134/83, 126/81 and 135/83 mmHg respectively. 24-hour ABPM results were similar. Sauna and exercise group's mean daytime blood pressure was 100 mmHg while only sauna and control groups both obtained 102 mmHg [16].

On the other hand Podstawski et al. in a research engaging 45 overweight and sedentary men presented completely opposite findings. Average BP (blood pressure) during the last of four 10-minute sessions (with 5-minute breaks) reached 140/91 mmHg. This value is described as stage I hypertension. However in opposition to previous analyses, the

participants were not frequent sauna users [17]. Comparable data was found in another Polish research led by Pilch et al. Ten healthy men with BMI indicating obesity were told to undergo three 15-minute sauna sessions with 5-minute breaks. They did not train any sport or use sauna regularly. Scientists used dry and steam heat saunas. Both of them caused increase in systolic blood pressure (122,6 mmHg to 142,6 mmHg in dry sauna and 123,4 mmHg to 141,1 mmHg in wet sauna) and reduction in diastolic blood pressure (78,7 mmHg to 63,7 mmHg in dry sauna and 77,7 mmHg to 57,7 mmHg in wet sauna) [18]. These discoveries may reveal a fact of different behaviour of blood pressure depending on patient's habits. Regular sauna bathing is better tolerated and leads to greater and healthier changes in its values.

## Conclusion

Sauna bathing have several confirmed effects on our health which can be used to treat various diseases, especially cardiovascular ones. Only a few studies take up the topic of linkage of sauna and hypertension and their results are often opposite. Nonetheless most of them indicate greater or smaller drop of mean blood pressure in patients using sauna frequently. The effects are even better if patients exercise alongside with sauna bathing. Very small risk of harm and joy reported by subjects makes this method of therapy a good supplement for conventional schemes. On the other hand many of researches are limited by small number of participants. Because of this condition, it is hard to draw conclusions based only on their results. This means that further research is still needed.

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