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# Repeated thermal therapy improves impaired vascular endothelial function in patients with coronary risk factors

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## Abstract

**Objectives:** We sought to determine whether sauna therapy, a thermal vasodilation therapy, improves endothelial function in patients with coronary risk factors such as hypercholesterolemia, hypertension, diabetes mellitus and smoking.

**Background:** Exposure to heat is widely used as a traditional therapy in many different cultures. We have recently found that repeated sauna therapy improves endothelial and cardiac function in patients with chronic heart failure.

**Methods:** Twenty-five men with at least one coronary risk factor (risk group: 38 +/- 7 years) and 10 healthy men without coronary risk factors (control group: 35 +/- 8 years) were enrolled. Patients in the risk group were treated with a 60 degrees C far infrared-ray dry sauna bath for 15 min and then kept in a bed covered with blankets for 30 min once a day for two weeks. To assess endothelial function, brachial artery diameter was measured at rest, during reactive hyperemia (flow-mediated endothelium-dependent dilation [%FMD]), again at rest and after sublingual nitroglycerin administration (endothelium-independent vasodilation [%NTG]) using high-resolution ultrasound.

**Results:** The %FMD was significantly impaired in the risk group compared with the control group (4.0 +/- 1.7% vs. 8.2 +/- 2.7%,  $p < 0.0001$ ), while %NTG was similar (18.7 +/- 4.2% vs. 20.4 +/- 5.1%). Two weeks of sauna therapy significantly improved %FMD in the risk group (4.0 +/- 1.7% to 5.8 +/- 1.3%,  $p < 0.001$ ). In contrast, %NTG did not change after two weeks of sauna therapy (18.7 +/- 4.2% to 18.1 +/- 4.1%).

**Conclusions:** Repeated sauna treatment improves impaired vascular endothelial function in the setting of coronary risk factors, suggesting a therapeutic role for sauna treatment in patients with risk factors for atherosclerosis.

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