

Hyperthermic baths (HTB) in patients with moderate depression

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Depression is a leading cause of disability worldwide. Pharmacological treatment shows only small effects, significant central nervous side effects and over 30% do not respond to the treatment. Hyperthermia may influence the pathophysiology of depression, mainly the alterations in the autonomic nervous system. Hyperthermia is easily achieved in hyperthermic baths (HTB) with an increase in body core temperature of about 2°C in about 20 minutes in a 40°C hot bath. Hyperthermia can also be induced by infrared light, capacitive fields or microwaves. HTB improve sleep in healthy subjects, insomniac people and elderly patients with vascular dementia.

Our first trial showed a significant improvement of HTB in depressive disorders in the HAMD-Score compared to sham-light treatment (Naumann J, Sadaghiani C, Grebe J, Kaiffel S, Huber R. Effects of hyperthermic baths on depression, sleep and heart rate variability in patients with depressive disorder: a randomized controlled pilot trial *BMC Complement Altern Med.* 2017 Mar 28; 17(1):172) and similar results were found in our second trial comparing HTB with physical exercise.

Other trials show positive effects of hyperthermia induced with infrared light (IR-HT) (Whole-Body Hyperthermia for the Treatment of Major Depressive Disorder: A Randomized Clinical Trial. Janssen CW, Lowry CA, Mehl MR, Allen JJ, Kelly KL, Gartner DE, Medrano A, Begay TK, Rentscher K, White JJ, Fridman A, Roberts LJ, Robbins ML, Hanusch KU, Cole SP, Raison CL. *JAMA Psychiatry.* 2016 Aug 1; 73(8):789-95.)

As a conclusion hyperthermia may have a relevant effect in depressive disorders but larger trials needed to confirm this. Larger effects are seen in severe depression. There is a fast onset of treatment effects (IR-HT even immediate) and less adverse effects than many antidepressants. HTB may be less influenced by antidepressant medication, whereas IR-HT may have larger and longer lasting effects. But there are many open questions, as which way to achieve hyperthermia is more effective,

whether single or serial intervention is better and which maximum body core temperature should be achieved.

Naumann J, Grebe J, Kaifel S, Weinert T, Sadaghiani C, Huber R. Effects of hyperthermic baths on depression, sleep and heart rate variability in patients with depressive disorder: a randomized clinical pilot trial. *BMC Complement Altern Med.* 2017 Mar 28;17(1):172. doi: 10.1186/s12906-017-1676-5.