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Application of hypoxic preconditioning in the treatment of Alzheimer's disease

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Statement of the problem: Physical activity significantly reduces the risk and impede progress of Alzheimer's disease. Studies indicate that the brain remains modifiable into late adulthood. Hippocampus and prefrontal lobes, which are most affected by AD, might be especially sensitive to the regenerative interventions. Studies confirm efficacy of physical training in AD prevention and treatment, though multiple obstacles remain unresolved. Thus, overcoming low compliance to physical exercising, particularly among senior and disabled patients, is important. Fortunately, all benefits of physical exercising, and much more, would be achieved without applying common exercising routine "per se", but using instead a particular mode of controlled normobaric intermittent oxygenation: The Intermittent Hypoxic - Hyperoxic Training (IHHT), which is applied with the help of special breathing training equipment.

Clinical practice: The IHHT is based on the hypoxic preconditioning phenomenon. The method allows overcoming low compliance to physical exercising among AD patients. It provides alleviation of oxidative stress, suppression of neuroinflammation, as well as stimulation of neuroplasticity and brain tissue regeneration. IHHT induces mitochondrial rejuvenation and attenuates oxidative/nitrosative stress, stimulates the endogenous coenzyme Q10 synthesis, activates hypothalamic-pituitary-adrenocortical axis, activates Hsp 70 pathway,

stimulates dopaminergic, noradrenergic, serotonergic neurotransmission, balances immune function, and boosts neurotrophic factors. The initial improvements (behavior, emotional balance, sleep normalisation) frequently observed during the first three to five IHHT sessions. Improvement of cognitive and executive functions can take weeks to months of treatment. The morphological recovery of brain tissues can be evaluated approximately 12 months after the beginning of the program. To facilitate intracellular repair pathways, an individualized supplementation and nutritional program is essential. The author published a case study of an elderly female patient diagnosed with AD in 2007. The integrative IHHT-based treatment began in 2008, resulting in a stable remission of AD and remarkable brain recovery (functional and morphological) achieved during six months of continuous treatment. Until present (Nov. 2018), the patient continues a maintenance treatment program at home and shows stable cognitive and executive functionality and enjoys a high quality of life.

Conclusion and significance: Our experience, supported by published research, provides justification for the initiation of a pilot study with patients suffering from AD.

Keywords: Alzheimer's disease, Dementia, the Intermittent Hypoxic-Hyperoxic Training (IHHT)

Biography

Arkadi F Prokopov is founder and Scientific Director of Athletic HighTech S.L. a private company providing education in use of the normobaric intermittent hypoxic-hyperoxic treatment (the IHHT), as well as conducting research and development of related technology. After graduating from the First Setchenov Medical Institute in Moscow, Russia in 1980 he practiced medicine and worked for 10 years in biomedical research on

saturation divers and astronauts. Since 1994 he has practiced integrative medicine in Heidelberg, Germany. In 2000 - 2004 he worked in the USA as medical consultant for the IHHT. He has several patents in the field of the IHHT, publishes articles in scientific journals and conducts workshops and seminars for physicians in Germany, Spain and Russia.

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