Combination of Moderate Running, Diaphragmatic Breathing, and Eye Movement Desensitization as a Novel Therapy in the Treatment of Migraine

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Abstract

Objective: Exercise regulates Nitric Oxide (NO) and brain-derived neurotrophic factor (BDNF)-dependent activities. Eye movement desensitization stimulates NO in autonomic nerve fibers in the retina. Diaphragmatic breathing stimulates NO in vascular endothelial cells—linings of blood vessels. Nitric Oxide has a relaxant role in the blood vessels and has been implied as a neural messenger. In addition, BDNF and its relationship with oxidative stress is fundamental in terms of homeostasis. Furthermore, roles of NO and BDNF in the migraine brain are known. Therefore, the present study is focusing on aerobic exercise, Eye movement desensitization, and diaphragmatic breathing as novel therapies or life-style modifications in the treatment of non-chronic migraine.

Methods: A three-group, pre-post-test and single blind-randomized study in which migraine pain frequency per month, pain duration and pain intensity per attack were measured and compared before and after the intervention. The targeted migraine patient's population was diagnosed and screened based on international classification of headache disorders, 3rd edition (ICHD-3). They were randomly divided to two experimental (running plus eye movement desensitization, n=19 or running plus diaphragmatic breathing, n=22) and a control (n=22) group. Moderate running plus eye movement desensitization group was scheduled to perform 3.2 kilometers running every other evening—three-time per week. They were also trained to breath every moment two deep nasal inhalations, two seconds repose, and three deep oral exhalations during running. The same group performed eye movement desensitization—30 minutes before breakfast and 30 minutes before bed, every night—for 10 consecutive weeks. The other experimental group did the same, but instead of eye movement desensitization, they performed diaphragmatic breathing—three-time (every time five minutes; in an upright position, two deep nasal inhalations, two seconds repose, and three deep oral exhalations) per day, for 10 consecutive weeks.

Results: The results of a series of MANCOVAs showed that moderate running plus eye movement desensitization and moderate running plus diaphragmatic breathing, significantly (p<0.05) reduce pain characteristics in non-chronic migraine patients in both experimental groups compared to the control group at the posttest.

Conclusion: The results of present study show that moderate running plus eye movement desensitization and moderate running plus diaphragmatic breathing can be applied as novel therapies in the treatment of non-chronic migraine.

Keywords: Migraine Treatment, Nitric Oxide, Brain-Derived Neurotropic Factor