Self-paced slow deep breathing: persistence of effects on vascular function

Kelly KL¹, Dick TE², Joyner MJ³, Lin J¹, Moser JS¹, Wehrwein EA¹,³

¹Mich St Univ, ²Case West Reserve Univ, ³Mayo Clinic

Slow deep breathing (SDB) exercises have been practiced for centuries for their health benefits. In order to have a long-term therapeutic benefit the effects of SDB must persist. We tested the hypothesis that physiological effects persist after an acute SDB bout. Healthy subjects (n=14, 10M/4F, age 18–35) rested supine for 20 minutes (baseline), followed by 20 minutes of self-paced SDB without any device-guided cues, then completed 20 minutes of endogenous breathing (recovery). Venous occlusion plethysmography was used to measure forearm blood flow (FBF: ml/min/100 dl tissue) to assess vasodilation. Respiratory rate (RR), monitored by a double pneumobelt, was 13.4 ± 0.74 breaths/min during baseline, 6.03 ± 0.51 during SDB (p<0.05), and 12.75 ± 0.95 during recovery. FBF increased immediately during the first minute of SDB (SDB: 2.3 ± 0.2 vs Baseline: 1.7 ± 0.2, p<0.05) and persisted to the end of recovery. Participants were categorized into four bins: high (n=3), medium (n=7), low (n=4), and negative (n=2) responders, which had mean percent changes in FBF during SDB of +49.1%, +27.6%, +8.4%, and -5.6%, respectively, where positive changes indicate vasodilation. SDB resulted in vasodilation in 86% of subjects and 43% had sustained effects lasting at least 20 min. One potential factor in responses to SDB is the level of mindfulness achieved by the subjects, which may account for the varied responses. We are now assessing state and trait anxiety scores along with psychological assessments of mindfulness to see if psychological aspects are predictive of response magnitude. The persistence of responses is promising for long-term efficacy of a regular SDB practice and it is vital to better understand the variability in responses to ensure that SDB practitioners yield maximum benefit.