Mid Atlantic Regional Chapter
of the
American College of Sports Medicine

Annual Scientific Meeting, November 5th- 6th, 2021
Conference Proceedings
International Journal of Exercise Science, Issue 9, Volume 10

The Effect of Meditation on Heart Rate Variability

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Heart rate variability (HRV) reflects the autonomic balance of the sympathetic (SNS) and parasympathetic (PNS) nervous systems. The frequency and time domains of an ECG are analyzed to determine the influence of PNS activity. HRV has been shown to be influenced by exercise training; however, meditation and guiding breathing techniques may also influence HRV. **PURPOSE:** To evaluate the effect of a short, guided meditation session on the measures of heart rate variability of inexperienced meditators. **METHODS:** 39 participants (18-21 years) volunteered and gave informed consent. During the experimental session, a Polar H10 heart rate monitor was fitted around the subject to record a 15-minute ECG. The breathing protocol consisted of sitting in a comfortable position and continuous 5-minute stages of spontaneous breathing (SP1), controlled breathing (CB), and returning to spontaneous breathing (SP2). During CB, a 6 breath/min guided protocol was followed using a commercially available App. A one-way ANOVA with repeated measures was conducted for each variable using SPSS, $p > 0.05$. **RESULTS:** CB produced a significant increase in heart rate from 70.6$\pm$11.9 bpm to 72.9$\pm$10.4 bpm ($p<0.005$) during CB, and then decreased to 71.7$\pm$10.3 bpm ($p<0.05$). Measures of the frequency domain included high frequency (HF) and low frequency (LF) power. HF significantly decreased from 49.2$\pm$21.1 nu during SP1, to 16.6$\pm$9.9 nu ($p<0.005$), and returned to 34.6$\pm$18.3 nu ($p<0.005$). For LF, SP1 was 50.9$\pm$21.0 nu, significantly increased to 83.4$\pm$9.9 nu ($p<0.005$), and returned to 65.4$\pm$18.3 nu ($p<0.005$). The measures of the time domain included rMSSD and SDNN. rMSSD at SP1 was 60.9$\pm$33.8, significantly increased to 74.2$\pm$36.6 ($p<0.005$), and returned to 56.0$\pm$33.1 ($p<0.005$). The SP1 for SDNN was 62.7$\pm$31.4, significantly increased to 110.4$\pm$39.6 ($p<0.005$), and returned to 66.1$\pm$29.7 ($p<0.005$). **CONCLUSION:** The direction and magnitude of change in frequency domain (HR, HF and LF) may initially suggest a dampening of the PNS. However, CB has been showed to initiate SNS activity which is represented in the frequency measures. In short-term HRV measures, rMSSD and SDNN are the more appropriate measures to consider for the PNS activity. Thus, the results of this study indicate that a short session of CB may stimulate a PNS response.