Effect of a single Audio-Visual Brain Entrainment session on Heart Rate Variability: a clinical trial with 100 adult volunteers

Michael Porter[1], Patrick Porter[1,2], Afonso Inoue Shiguemi Salgado[1] and Francisco J Cidral-Filho[1]

[1] Integrative Physical Therapy Residency - Salgado Institute of Integrative Health, Londrina, PR - Brazil.
[2] Quantum University, Honolulu, HI - USA.

Contact: pporter@braintap.com

OBJECTIVE

The objective of this study was to investigate the effect of the Audio-Visual Brain Entrainment (ABE) on Heart Rate Variability.

RESULTS

ABE significantly (1) increased Heart Rate Variability: HRV Index (A low HRV is associated with an increased risk of cardiovascular disease - $p<0.001$, 21.8%) and RRNN (RR normal-to-normal intervals; a marker of overall HRV activity - $p<0.001$, 6.8%); (2) increased Parasympathetic activity markers: RMSSD (Root Mean Square of the Successive RR interval Differences - $p<0.0001$, 32.2%), NN50 (The number of pairs of successive NN (R-R) intervals that differ by more than 50 ms - $p<0.0001$, 50.6%), pNN50% (The proportion of NN50 divided by the total number of NN (R-R) intervals - $p<0.001$, 51.6%), HFnu (High Frequency Band: index of modulation of the parasympathetic branch of the autonomic nervous system - $p<0.0336$, 37.1%), and LFnu: (Low Frequency Band: general indicator of aggregate modulation of both the sympathetic and parasympathetic branches of the Autonomic Nervous System - $p<0.0048$, 45.1%); and (3) decreased Stress Index ($p<0.001$, 38.4%) and Heart Rate ($p<0.0001$, 6.2%).

METHODOLOGY

Sample size consisted of 100 adult volunteers (50 males and 50 females) with no hearing disabilities. ABE was delivered with a BrainTap headset (New Bern - NC - USA - Figure 1 - Panel B) in a 20-minute session. Session consists of Binaural beats at 18 to 0.5 HZ, Isochronic Tones at 18 to .0.5 HZ and visual Entrainment through light-emitting diode lights at 470 nanometers (nm) flickering at 18 to 0.5 HZ. Heart rate Variability (Dinamika HRV - Advanced Heart Rate Variability Test System, Moscow, Russia - Panel A) was assessed at baseline and after ABE session.

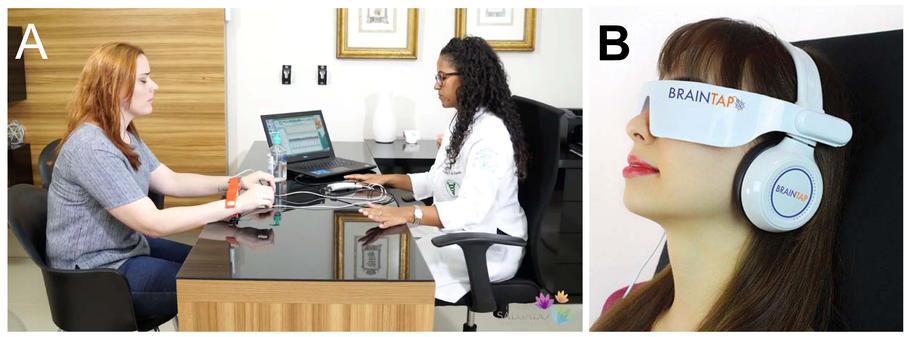

Figure 1 - A) HRV assessment. B) Audio-Visual Brain Entrainment with BrainTap headset.

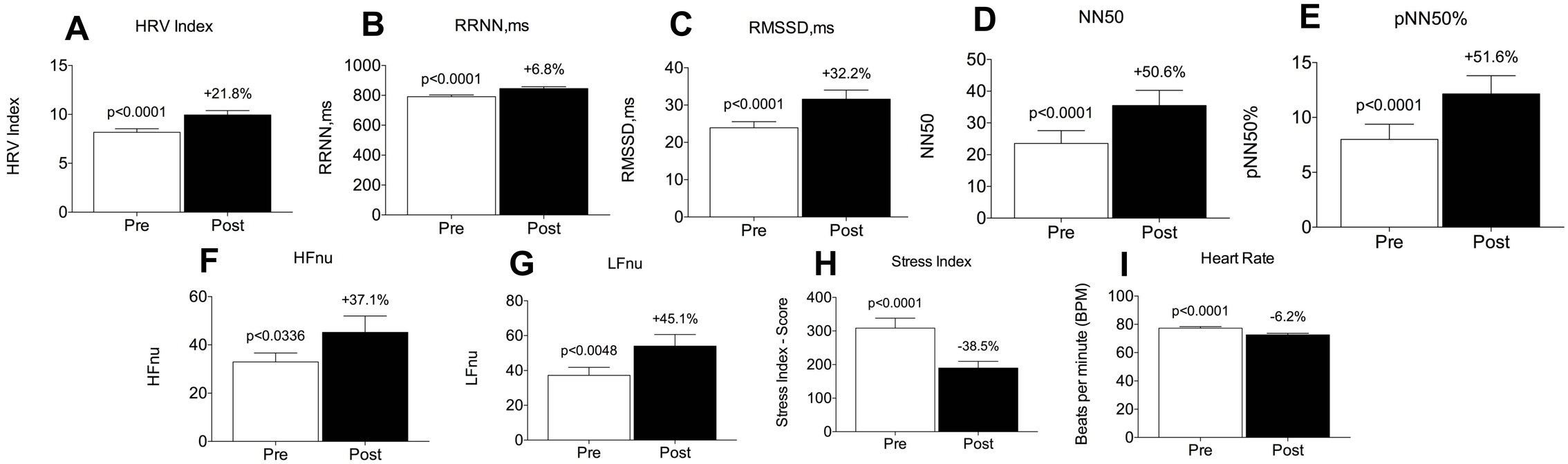

Figure 2 - Audio-Visual Brain Entrainment on Hear Rate Variability. A = HRV Index, B = RRNN, C = RMSSD; D = NN50; E = NN50%; F = HFnu; G = LFnu; H = Stress Index; I = Heart Rate. Data were expressed as mean ± standard deviation (SD) n = 100 per group. Student's T-test was used.

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CONCLUSIONS

A single Audio-Visual Brain Entrainment session with the BrainTap Headset significantly increased heart rate variability and parasympathetic activity, as well as decreased stress index and heart rate.