Comparison of the Acute Effect of Transcutaneous Auricular Vagus Nerve Stimulation at Two Sites on Cardiac Autonomic Modulation and Blood Pressure in Healthy and Hypertensive Individuals: Randomized Crossover Clinical Trial

Bruno Paulino Venâncio

Doctoral and Master's Program in Rehabilitation Sciences at the Nove de Julho University (UNINOVE) – São Paulo, Brazil

Raphael Ritti Dias

Doctoral and Master's Program in Rehabilitation Sciences at the Nove de Julho University (UNINOVE) – São Paulo, Brazil

Paulo Henrique leite Souza

Doctoral and Master's Program in Rehabilitation Sciences at the Nove de Julho University (UNINOVE) – São Paulo, Brazil

Gustavo Oliveira da Silva

Doctoral and Master's Program in Rehabilitation Sciences at the Nove de Julho University (UNINOVE) – São Paulo, Brazil

Fernanda Colombo

Doctoral and Master's Program in Rehabilitation Sciences at the Nove de Julho University (UNINOVE) – São Paulo, Brazil

Fernanda Ishida Corrêa

Doctoral and Master's Program in Rehabilitation Sciences at the Nove de Julho University (UNINOVE) – São Paulo, Brazil

Abstract:

Objective: To compare the acute Transcutaneous Auricular Vagus Nerve Stimulation (TAVNS) effects at two sites on blood pressure (BP) and heart rate variability (HRV) in hypertensive and healthy individuals.

Methods: Fourteen hypertensive and fourteen healthy adults underwent a 30-minute TAVNS session targeting the tragus and cymba conchae. BP systolic (SBP) and diastolic (DBP) (mmHg) and HRV (high frequency - HF, low frequency – LF, and the ratio between high and low frequency - LF/HF) were measured before, during, and after stimulation.

Results: TAVNS in the cymba conchae reduced LF (p=0.025) and LF/HF (p=0.030) while increasing HF (p=0.025) in hypertensive patients. In healthy individuals, it increased LF (p=0.000) and LF/HF (p=0.005) but decreased HF (p=0.000) from stimulation to post-stimulation. TAVNS on the tragus had no significant effects on LF or LF/HF in hypertensive patients. However, in healthy individuals, LF (p=0.022) and LF/HF (p=0.014, p=0.005) increased from baseline and during stimulation to post stimulation. TAVNS on the cymba conchae did not affect BP in hypertensive patients, but in healthy individuals, it significantly decreased SBP (p=0.044) and DBP (p=0.020). TAVNS on the tragus significantly reduced DBP in hypertensive patients (p=0.036), with no significant changes in healthy individuals.