

The Influence of Age and Cardiorespiratory Fitness on Cardiac Autonomic Modulation. A Pilot Study.

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ABSTRACT

Maximal rate of oxygen consumption (VO₂max) is traditionally viewed as the gold standard of determining cardiorespiratory fitness (CF) in healthy and diseased populations. CF has a significant influence on the improvement of cardiac autonomic modulation (CAM) and the risk of morbidity and mortality rates. Heart rate variability (HRV) is a non-invasive way to assess CAM. Age is another factor that influences CAM and CF in healthy and diseased populations. However, what is not fully elucidated, is if CF is maintained at a high level throughout adulthood, will CAM remain relatively unchanged.

PURPOSE: To determine if age and CF are significantly correlated to variables of HRV to determine CAM in healthy fit individuals. **METHODS:** Twenty-two healthy individuals (n = 14 male; n = 8 female, Age 33.2 ± 11.8 years, %BF 18.3 ± 6.0, VO₂max 42.0 ± 6.2 ml/ /kg/ min) completed a single health assessment to quantify CF and HRV. HRV was measured for 5 mins in the supine position and during a standard VO₂max test using an elastic belt and Bluetooth monitor (Polar H7). CardioMood software was used to process HRV variables high frequency (HF), low frequency (LF), total power (TP) were assessed for frequency domain, and standard deviation of all NN intervals (SDNN) and the square root of the mean of the squares of successive R-R interval differences (RMSSD) for the time domain. Pearson correlation was used to check associations between age and CF, and CAM. Multiple regression was implemented to determine if there were any differences in HRV variables in relation to age and VO₂max. A paired sample t-test was used to determine changes in HRV variables from rest to VO₂max. All analyses were performed using SAS (v.9.3). **RESULTS:** HRV variables were significantly altered from rest to VO₂max (p < 0.05). HRV time and frequency domain variables were not significantly correlated to age and CF level (p > 0.05). The multiple regression analysis indicated that the only significance was max heart rate is 0.642 bpm lower during exercise for each 1-year increase in age (p = 0.035). **CONCLUSION:** The analysis of pilot data focused on determining the impact of CF and age on CAM appears not to be significantly correlated when utilizing HRV. However, due to the project's continuation and further data collection, significant outcomes may still be observed.