ABSTRACT

The influence of chronotropic incompetence on maximum aerobic capacity and heart rate responses during boxing in Parkinson's disease

Tone Panassollo

Keywords: Parkinson's disease, chronotropic incompetence, heart rate, aerobic capacity

Non-contact boxing (NCB) is a popular form of high-intensity interval training used to improve aerobic capacity (VO2peak) which may be reduced in people with Parkinson's disease (PD). However, heart rate (HR) responses are likely to vary in this population due to chronotropic incompetence (CI), described as the inability to raise HR to at least 85% of predicted maximum HR (HRmax), and is present in 40-50% of the PD population. In this presentation, I describe the impact of CI on VO2peak and HR responses during NCB. 25 people with PD and 16 age-matched controls underwent a cardiopulmonary exercise test (CPET) to identify the presence of CI and to determine VO2peak, HRmax, and %HRmax. Two boxing sessions then were performed on different days, during which HR response was measured via Polar H10 and further expressed as %HRmax predicted (220-age), and %HRmax obtained during CPET. Results from this study show that CI was present in 11 participants with PD (PDCI), with peak HR on average 30 beats lower than those without CI (PDnonCI). There was also a trend for lower VO2peak in the PDCI group and a significantly lower HR during each boxing round ($p \leq 0.001$). However, data from CPET shows that all groups were able to exercise in the high-intensity training zone. This study is the first to show that people with PD have the capacity to exercise in a high-intensity zone during NCB despite the presence of CI, which is encouraging. The results also show that %HRmax based on predicted equations do not accurately reflect exercise intensity, especially for people with CI. They should therefore be used with caution as a basis for high-intensity training regimes.