Abstract

Objective: To investigate the cardiac autonomic responses during upper versus lower limb discontinuous resistance exercise (RE) at different loads in healthy older men. Method: Ten volunteers (65±1.2 years) underwent the one-repetition maximum (1RM) test to determine the maximum load for the bench press and the leg press. Discontinuous RE was initiated at a load of 10%1RM with subsequent increases of 10% until 30%1RM, followed by increases of 5%1RM until exhaustion. Heart rate (HR) and R-R interval were recorded at rest and for 4 minutes at each load applied. Heart rate variability (HRV) was analyzed in 5-min segments at rest and at each load in the most stable 2-min signal. Results: Parasympathetic indices decreased significantly in both exercises from 30%1RM compared to rest (rMSSD: 20±2 to 11±3 and 29±5 to 12±2 ms; SD1: 15±2 to 8±1 and 23±4 to 7±1 ms, for upper and lower limb exercise respectively) and HR increased (69±4 to 90±4 bpm for upper and 66±2 to 89±1 bpm for lower). RMSM increased for upper limb exercise, but decreased for lower limb exercise (28±3 to 45±9 and 34±5 to 14±3 ms, respectively). In the frequency domain, the sympathetic (LF) and sympathovagal balance (LF/HF) indices were higher and the parasympathetic index (HF) was lower for upper limb exercise than for lower limb exercise from 35% of 1RM. Conclusions: Cardiac autonomic change occurred from 30% of 1RM regardless of RE limb. However, there was more pronounced sympathetic increase and vagal decrease for upper limb exercise than for lower limb exercise. These results provide a basis for more effective prescription of RE to promote health in this population.

Keywords

Physical therapy, resistance exercise, autonomic nervous system, elderly, upper limbs, lower limbs.