

Skeletal muscle oxidative capacity during on-transient exercise in young and middle-aged women: preliminary findings

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BACKGROUND

- The function of the skeletal muscle declines throughout aging;
- Aerobic exercise interventions are typically prescribed as a viable tool to promote oxygen delivery to contracting muscles
- However, previous findings on exercise interventions show that aging individuals predominantly rely on nonoxidative metabolism for energy production during exercise on-transients, which could lead to premature fatigue and exercise cessation;

STUDY AIM

- The aim of this study was to investigate whether aging affects time-course changes in the oxidative capacity of the vastus lateralis muscle (VL) during on-transient exercise in physically active young and middle-aged women;
- In addition, this study sought to investigate the explanatory role of muscle oxidative capacity on the gas exchange threshold (GET) performance in the above-mentioned population.

MATERIALS AND METHODS

- Twenty-three, healthy, active, normotensive women were separated into two groups: young (n=12, 25±3 y, VO₂ peak=38±3 mL kg min⁻¹) and middle-aged (n=11, 44±4 y, VO₂ peak=38±8 mL kg min⁻¹);
- All participants underwent a general medical examination, their muscle mechanical properties were evaluated via Tensiomyography, and VO₂ peak was determined via graded exercise test on a stationary bike;
- After a VO₂ peak test, all women returned to the laboratory within 48 hours to perform an on-transients exercise test, as previously described in the literature by Murias et al. (2011);
- The oxygenation profile of the VL muscle during on-transient exercise was monitored by near infrared spectroscopy (NIRO 200, Hamamatsu Photonics, Japan);
- Arterial blood pressure and heart rate were constantly monitored using photoplethysmograph (Finapres Medical Systems, the Netherlands) using a pneumatic cuff positioned around the middle finger of the right hand throughout;
- The time-course of muscle deoxygenation (HHb, μM), HR kinetics (beat-by-beat) and oxygen uptake (breath-by-breath) were all analyzed via a nonlinear monoexponential model.

RESULTS

Figure 1. Adaptation of muscle deoxygenation during a step change in work rate

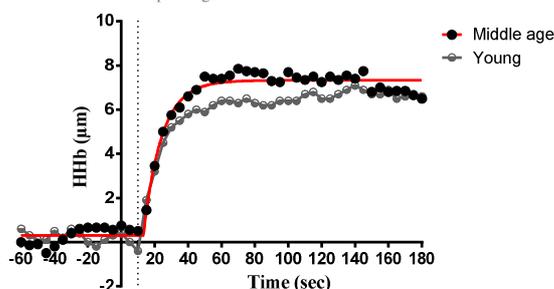
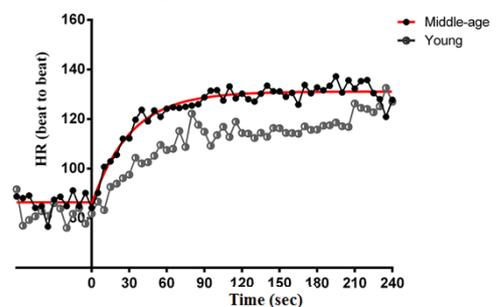


Figure 2. Adaptation of heart rate kinetics during a step change in work rate



CONCLUSION

- There were no significant differences between the two groups in the time-course changes in VL oxidative profile (τ) during the on-transient exercise;
- The data presented here suggest that factors other than aging or muscle oxidative capacity govern the cycling performance in GET in physically active women.

