$V'O_2$ kinetics in response to High-Intensity-Interval Training (HIT) and isoinertial resistance training (IRT) in older, healthy men

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High intensity exercise training (HIT) accelerates $V'O_2$ kinetics (VO_{2k}) in older subjects. It is controversial whether IRT may elicit the same adaptation. We explored the effect of HIT and IRT on VO_{2k} and muscle deoxygenation during moderate intensity exercise in older, healthy men. 12 men (68 yy ± 4) were exposed to 8 weeks (3 times a week) of: i) HIT, and, after 4 months, ii) IRT performed with an isoinertial YoYo. Before and after training we measured: i) $V'O_2$ peak ($V'O_{2p}$); ii) breath-by-breath $V'O_2$ and fractional muscle O_2 extraction (ΔHHb) of vastus lateralis by quantitative NIRS during step-exercise transitions of moderate intensity. VO_{2k} was modeled by means of a double - exponential function to obtain the time constant (Tau) of its primary component. The normalized ΔHHb to $\Delta V'O_2$ ratio ($\Delta HHb/\Delta V'O_2$) was calculated as and index of the matching between muscular O_2 delivery (VO_{2m}) and uptake (Q_aO_2). $V'O_{2p}$ increased after HIT (29.9 mL min-1 kg-1 ± 4.3 - 32.6 mL min-1 kg-1± 6.0, $p<0.05$); it was not affected by IRT. Tau decreased after HIT (26.97 s ± 5.54 - 19.63 s ± 4.31, $p<0.05$); it did not change after IRT. Peak $\Delta HHb/\Delta V'O_2$ was smaller after HIT (1.83 ± 0.63 - 1.23 ± 0.37, $p<0.05$); it was not affected by IRT. 8 weeks of HIT accelerated $V'O_{2k}$ and improved the matching between Q_aO_2 and VO_{2m}. IRT did not lead to any improvement of $\Delta HHb/\Delta V'O_2$ and left $V'O_{2k}$ unchanged. Results suggest that the acceleration of $V'O_{2k}$ was mainly due to the improved matching of VO_{2m} to Q_aO_2.