

D. Salvadego, S. Lazzer, C. Busti, R. Galli, F. Agosti, C. Lafortuna, A. Sartorio, B. Grassi

Gas exchange kinetics in obese adolescents. Inferences on exercise tolerance and prescription

American Journal of Physiology - Regulatory, Integrative and Comparative Physiology 299: R1298–R1305, 2010

A functional evaluation of skeletal muscle oxidative metabolism was performed in a group of obese adolescents (OB). The various components of pulmonary O_2 uptake (VO_2) kinetics were evaluated during 10-min constantload exercises (CLE) on a cycloergometer at different percentages of $\text{VO}_{2\text{max}}$. The relationships of these components with the gas exchange threshold (GET) were determined. Fourteen male OB [age 16.5 ± 1.0 (SD) yr, body mass index $34.5 \pm 3.1 \text{ kg}\cdot\text{m}^{-2}$] and 13 normal-weight, age-matched nonathletic male volunteers (control group) were studied. The time-constant (τ_f) of the fundamental component and the presence, pattern, and relative amplitude of the slow component of VO_2 kinetics were determined at 40, 60, and 80% of $\text{VO}_{2\text{max}}$, previously estimated during an incremental test. $\text{VO}_{2\text{max}}$ (l/min) was similar in the two groups. GET was lower in OB ($55.7 \pm 6.7\%$ of $\text{VO}_{2\text{max}}$) than in control ($65.1 \pm 5.2\%$) groups. The τ_f was higher in OB subjects, indicating a slower fundamental component. At CLE 60% (above GET in OB subjects, below GET in control subjects) a slow component was observed in nine out of fourteen OB subjects, but none in the control group. All subjects developed a slow component at CLE 80% (above GET in both OB and control). Twelve OB subjects did not complete the 10-min CLE 80% due to voluntary exhaustion. In nine OB subjects, the slow component was characterized by a linear increase in VO_2 as a function of time. The slope of this increase was inversely related to the time to exhaustion. The above findings should negatively affect exercise tolerance in obese adolescents and suggest an impairment of skeletal muscle oxidative metabolism. Also in obese adolescents, exercise evaluation and prescription at submaximal loads should be done with respect to GET and not at a given percentage of $\text{VO}_{2\text{max}}$.

Se desidera avere la fotocopia di questo lavoro, per esclusivo uso personale, può fare richiesta per mail a: info@cresceresani.it indicando il titolo, gli autori, la rivista e il proprio recapito lavorativo (nome, cognome, indirizzo, CAP, città).