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Effects of Increased Respiratory Resistance on Maximal O<sub>2</sub> Uptake and Anaerobic Threshold during Incremental Exercise Tests

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**Abstract:** This study was undertaken to assess whether maximal O<sub>2</sub> uptake (VO<sub>2</sub>max) can be used as an index of measuring aerobic capacity under the condition of increased respiratory resistance. Seven male subjects performed two incremental exercise tests on a cycle ergometer on different days: one control (C) and one breathing through an 8 mm bore diameter respiratory resistance (R). Ventilatory and gas exchange responses were measured with a turbine volume transducer and mass spectrometry, and processed breath-by-breath. VO<sub>2</sub>max was measured and anaerobic threshold (AT) was estimated non-invasively using the V-slope method. Maximal exercise performance was reduced significantly (by paired t-test, P<0.05) in the resistance study (233 ± 14 W) compared to the control (260 ± 29 W). The plateau in VO<sub>2</sub> is not a consistent feature of incremental exercise tests even in the control study at the subjects' maximum effort. VO<sub>2</sub> at maximal exercise performance was also reduced significantly from 3.25 ± 0.40 l/min (C) to 2.83 ± 0.20 l/min (R). However, there were no significant differences between AT for both tests: 1.80 ± 0.28 l/min (C) and 1.81 ± 0.28 l/min (R). These results establish that AT actually reflects aerobic capacity. Therefore, AT should be determined systematically in addition to VO<sub>2</sub>max during maximal exercise tests to better evaluate physical fitness.

**Key Words:** O<sub>2</sub> uptake, Anaerobic threshold, Exercise test

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