$VO_{2\max}$ plateau at the end of an incremental test.

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Abstract : The purpose of this study was to 1) validate a new exercise protocol allowing to get VO2max plateau in fit and unfit subjects at the end of a classical incremental test 2) to test the hypothesis that VO2 max plateau duration was not positevely correlated with VO2max and 3) limiting factors of VO2max plateau duration are different from those of VO2max amplitude. Fourteen subjects performed two incremental cycling tests at three days interval: 1) a classical incremental test (CInc) to determine VO2max, the power at VO2max (PVO2max) and at the lactate threshold (PLT) 2) a new incremental (NInc) in which the power was decreased just after the subject reached VO2max. During all the test, Heart rate (HR), stroke volume (SV), cardiac output (CO) the arterio-veinous difference (Da-vO2) and the oxygen blood saturation (SaO2) were recorded. The results showed that all the subject got a long VO2max plateau (6 min 8s ± 3 min 2s), including those who did not have any VO2max plateau at the end of CInc (n = 5). VO2max plateau duration was inversely correlated with VO2max (r = -0.53, p= 0.04). the VO2max amplitude was correlated with the power at SVmax ($p < 0.001$, $r = 0.888$) and with the Da-vO2 ($p < 0.01$, $r = 0.483$). Whereas the VO2max plateau duration was correlated with the time during the power decrease expressed in VO2max plateau duration ($r = -0.72$, $p = 0.003$) but not with SV, CO, Da-vO2, SaO2 ($p > 0.05$) or not with PVO2max ($p > 0.05$). In conclusion, this protocol showed that it was possible to get a VO2max plateau at this end of classical incremental test in every subjects that attest the achievement of the true VO2max. The VO2max plateau duration was independent of VO2max amplitude and it limiting factors. Thus, the first limiting factor of the VO2max plateau duration was the power output at this end of the test.

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