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CORRESPONDENCE

Prediction of metabolic and cardiopulmonary responses to maximum cycle ergometry

To the Editor:

We were interested by the study of NEDER *et al.* [1] on maximal exercise in university staff at São Paulo, Brazil. In particular, after allowing for age and fat-free mass, the authors reported a partial regression coefficient for maximal oxygen consumption ($\dot{V}O_2$) ($\dot{V}O_{2,max}$) and grade of leisure-time activity in males of 0.16 $L \cdot min^{-1} \cdot grade^{-1}$. This was the same as that observed in shipyard workers (7.1 $mmol \cdot min^{-1} \cdot grade^{-1}$) [2] and in firemen before and after a course of physical training [3]. The parameter is a useful reference value in its own right.

We are less happy with the author's claim that the "normal" $\dot{V}O_{2,max}$ is necessary for the clinical evaluation of respiratory patients. The reference $\dot{V}O_{2,max}$ seems to us to be essential for evaluating disablement [4]. However, patients with irreversible respiratory impairment cannot attain the same maximal work rates or $\dot{V}O_2$ as healthy control subjects; hence the values of these parameters are of limited importance. By contrast, reference values for ventilation, cardiac frequency and related variables at levels of exercise which are submaximal for healthy subjects, but which patients can attain, seem to us to be essential for proper management [5].

We urge the authors to now address their submaximal data. A model for how the data might be presented has been reported [6].

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From the authors:

We thank J.E. Cotes and J.W. Reed for their comments on our study [1]. We too were pleasantly surprised by the degree of coherence between their results and ours, regarding the partial regression coefficient for maximal oxygen consumption ($\dot{V}O_{2,max}$) on grade of leisure-time activity, despite the different protocols used [1, 2].

We must, however, take issue with two assertions in the letter. First, ours was not a study of "university staff in São Paulo" but a randomized study of "sedentary university staff in São Paulo", the distinction is vital. Secondly, we do not believe that "a normal $\dot{V}O_{2,max}$ is necessary for the clinical evaluation of respiratory patients"; consequently, we did not say it! Although we do believe that peak $\dot{V}O_2$ is important for disability evaluation, we have demonstrated that the use of weight-corrected peak $\dot{V}O_2$ for this purpose, as suggested, for example, by the American Medical Association and the American Thoracic Society [3, 4], is prone to misinterpretation [5, 6]. In this context, we prefer to use absolute peak $\dot{V}O_2$ as compared to the predicted value (for rating the loss of aerobic capacity, *i.e.* compensation) or compared to the estimated metabolic demands of the work (for rating the remaining functional capacity, *i.e.* "fitness-for-duty") [5, 6].

We are however, in accord with J.E. Cotes and J.W. Reed regarding the importance of reference values for "submaximal" exercise and, naturally, we plan to publish this aspect of our findings. In fact, the results were presented at the 1998 European Respiratory Society Meeting in Geneva, the abstract of which is available in the European Respiratory Journal [7].

Finally, we are aware of J.E. Cotes' 1972 three-index article, to which we are referred as a model. Although we consider useful some of the suggested displays, we prefer to analyse the rate of change between selected variables, instead of a discrete analysis at a given ventilation or metabolic rate, as was proposed in this article.

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