LETTER TO THE EDITOR

Clinical $\dot{V}O_{2\text{peak}}$ is “part of the deal”

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TO THE EDITOR: We read with much interest the invited review of Drs. Poole and Jones (3) in which they waived the concept of $\dot{V}O_{2\text{peak}}$, and as far as we believe, based on fragile scientific arguments. Still, we believe Poole and Jones’ review is of interest to all those involved in exercise testing, and their work provides an interesting pabulum on the topic. But notwithstanding, we would like to comment on a few aspects in their paper that, with all respect, do not meet clinical daily practice.

Although we agree with the importance of the concept and theories of $\dot{V}O_{2\text{max}}$, we find it unfortunate that there is no reference to the both scientifically and clinically interesting and important parameters that can be identified in the phases before maximum or plateaued $\dot{V}O_2$, i.e., $\dot{V}O_{2\text{max}}$, and the absence of the scientific controversy regarding reliable breath-by-breath analysis in exercise testing. For instance, the concepts of aerobic/anaerobic and ventilatory thresholds encompass important clinical information that plays a major role to test a “training or therapeutic paradigm” in the sports and clinical setting without the necessity of having information of the maximum or plateau in $\dot{V}O_2$. We would also like to emphasis that the highest $\dot{V}O_2$ reached during a test, whether or not being a true $\dot{V}O_{2\text{max}}$, is of major clinical importance considering the wealth of information it provides concerning the subjective state of a patient under loading conditions and the therapeutic implications it has within a clinical setting.

The other comment we would like to make is the fact that the authors used technological progress in indirect calorimetry as one of the most important factors for waiving the concept of $\dot{V}O_{2\text{peak}}$. The authors made a firm statement that the combination of an incremental-ramp test with breath-by-breath analysis is the method of choice for experimental and clinical cardiorespiratory assessment. We, however, showed that mixing chamber systems have better accuracy and precision than breath-by-breath systems, according to theoretical error analysis based on general error propagation theory (1). The differences in results between mixing chambers and breath-by-breath analysis are caused by the fact that the methods compute the average expired oxygen and carbon dioxide fractions $\text{FE}_{O_2}$ and $\text{FE}_{CO_2}$ in a different way. Breath-by-breath systems calculate the expired gas volumes by integrating the product of flow and gas fractions, whereas mixing chamber systems measure $\text{FE}_{O_2}$ and $\text{FE}_{CO_2}$ directly in the mixing chamber. Moreover, Farmery et al. (2) showed that when employing breath-by-breath analysis, within-breath measurements are mandatory. Such measurements are an immediate function of time that cannot be provided by most clinical gas analyzers because of their slow response times (2).

Finally, we would like to comment on the by Poole and Jones advocated “short constant-work rate verification phase” after the steep-ramp test. First of all, we believe it is, at least in a clinical setting, unrealistic and unethical in certain patient populations, and we, alas, have to disagree with such explicit recommendation. Second, in patient populations you have to accept that the day-to-day (patho)physiological variation caused by nonphysiological elements is “part of the deal.”

DISCLOSURES

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AUTHOR CONTRIBUTIONS


REFERENCES