IMPROVEMENTS IN OXYGEN CONSUMPTION AT VENTILATORY THRESHOLDS ARE LIMITED BY ITS PROXIMITY TO VO_2MAX

BENÍTEZ-MUÑOZ, JA.[1], CUPEIRO, R[1]. AND GARCÍA-ZAPICO, A[2].

[1] LFE RESEARCH GROUP, DEPARTMENT OF HEALTH AND HUMAN PERFORMANCE. FACULTY OF PHYSICAL ACTIVITY AND SPORT SCIENCE (INEF). UNIVERSIDAD POLITÉCNICA DE MADRID. CALLE MARTÍN FIERRO 7, 28040 MADRID, SPAIN. [2] IMFINE RESEARCH GROUP. DEPARTMENT OF HEALTH AND HUMAN PERFORMANCE. FACULTY OF PHYSICAL ACTIVITY AND SPORT SCIENCE (INEF). UNIVERSIDAD POLITÉCNICA DE MADRID. CALLE MARTÍN FIERRO 7, 28040 MADRID, SPAIN

OBJECTIVE: It is traditionally assumed that in order to conduct high-intensity sessions, it is necessary to develop an "aerobic base" (1). However, this statement does not appear to be supported by scientific evidence. In fact, the best approach to obtain the maximum development of the oxygen consumption at the ventilatory thresholds 1 (VO_2VT1) and 2 (VO_2VT2), and maximum oxygen uptake (VO_2max) remain poorly understood. The purpose was to determine whether the threshold position [VO_2VT1 and VO_2VT2 relative to VO_2max (%VO_2maxVT1 and %VO_2maxVT2, respectively)] before training was associated with the improvement with training in VO_2VT1 and VO_2VT2 (ΔVO_2VT1 and ΔVO_2VT2). Additionally, to determine whether VO_2VT1 and VO_2VT2 before training was associated with the improvement with training in VO_2VT1 and VO_2VT2 (ΔVO_2VT1 and ΔVO_2VT2). **METHODS**: Fourteen males (20±1.9years; 68.6±1.9kg; 70.9±5.5ml/kg/min) performed an incremental test before and after the first three-month mesocycle of the season. The test started with 1 min at rest, followed by 3 min warm up at 50 W. Consequently, the load increased 5 W every 12 s until task failure. Expired gases were measured using a gas exchange analyser (Jaeger Oxycon Pro, Germany). VT1 and VT2 were determined as previously described (2). The following variables were measured: VO_2VT1, VO_2VT2, VO_2max, %VO_2maxVT1 and %VO_2maxVT2. The difference in VO_2VT1, VO_2VT2, %VO_2maxVT1 and %VO_2maxVT2 before and after the training program (ΔVO_2VT1, ΔVO_2VT2, Δ%VO_2maxVT1 and Δ%VO_2maxVT2, respectively) was calculated. **RESULTS**: ΔVO_2VT1 was inversely correlated with %VO_2maxVT1 before training (r=0.584; p=0.028) and ΔVO_2VT2 with %VO_2maxVT2 before training (r=0.54; p=0.046). In contrast, ΔVO_2VT1 was not correlated with VO_2VT1 before training (r=-0.497; p=0.071) nor ΔVO_2VT2 with VO_2VT2 before training (r=-0.091; p=0.758). **CONCLUSIONS**: The key finding is the inverse relationship between %VO_2maxVT1 and %VO_2maxVT2 before training with the improvements with training in VO_2VT1 and VO_2VT2, respectively. That is, those individuals with a lower threshold position before training, suffered a greater improvement with training in oxygen uptake at thresholds, regardless VO_2VT1 and VO_2VT2 before training. It seems that VO_2max limits the improvements in VO_2VT1 and VO_2VT2 in those individuals with a higher %VO_2maxVT1 and %VO_2maxVT2 before training (ceiling effect of VO_2max on VO_2VT1 and VO_2VT2). **PRACTICAL APPLICATIONS**: As a practical application, we can say that the threshold with a lower position (i.e., lower %VO_2maxVT1 or %VO_2maxVT2) should be prioritized, independently of the oxygen consumption at thresholds (VO_2VT1 or VO_2VT2).

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CORRESPONDENCE ADDRESS (PRESENTING AUTHOR):

José Antonio Benítez Muñoz: joseantonio.benitez.munoz@upm.es