

Summary of a study of 84 Veteran Runners in EVACS in Århus 2004

Oxygen Uptake Kinetics Do not Change with Age in Endurance Trained Master Athletes

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Everybody will have experienced that, as we start exercising, our breathing takes some time to 'catch up' with the work load. Conversely, after finishing an exercise, it takes a while until respiration returns back to normal. As illustrated in the figure, this delay between physical work and oxygen uptake by our lungs can be measured.

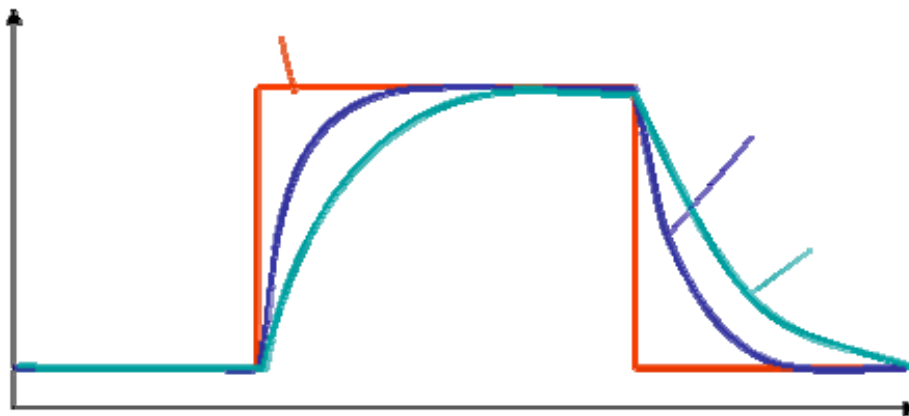
The physiological basis for the delay is a special energy store that can be burnt without oxygen (e.g. phosphocreatine, glucose). This allows us, for example, to withhold our breath for a short period. As we start to exercise, we partly deplete this energy store, which leads to an oxygen deficit that has to be restored when we return to rest. A car engine does not have any such oxygen-independent stores. It uses oxygen as it generates power, but it will stop immediately if there is no oxygen.

Exercise

Fast O₂-Kinetics

Slow O₂-Kinetics

Time



In scientific terms, the rapidity by which the respiration catches up with the work load is called 'oxygen uptake kinetics' (OUK). It is well known that endurance runners have a faster OUK than sprinters or usual people, and it is also known that older people in general have a slower OUK than younger people. In the present study, we wanted to find out whether this is an effect of ageing per se, or whether it might be explained by the lack of physical activity that most of the elderly have.

84 Master Runners participated in this study during the European Veteran Athletics Championships in Aarhus in 2004. They performed a short, sub-maximal bicycle test during which the oxygen uptake was continuously measured. Before and after the test, a blood sample was taken in order to measure blood lactate.

Our results indicate that OUK is faster in Master sprinters than in sedentary people of the same age, and that there is no slowing of OUK at all in endurance trained Master Athletes as they get older. This is in contradiction to the past scientific literature, where it was maintained that OUK automatically slow down with age. Our study has therefore yielded an important result, which affects our understanding of the ageing process. Moreover, this finding may imply beneficial news for the Master runners themselves. Many researchers believe that the oxygen deficit involves the production of substances (e.g. free radicals) that are detrimental to the cells of our body. Therefore, it is held that with a more rapid OUK such damage be minimized. If this is the case, then our study would suggest that endurance running is not more dangerous (at least in this respect) at old age than at young age.

The present study has recently been published in the International Journal of Sports Medicine:

Berger, N.A., Rittweger, J., Kwiet, A., Michaelis, I., Williams, A.G., Tolfrey, K., Jones, A.M. Pulmonary O₂ uptake On-Kinetics in Endurance- and Sprint-Trained Master Athletes. *Int J Sports Med* (2006).

Its abstract is available online for free at Public Medline under:

<http://www.ncbi.nlm.nih.gov/entrez/query.fcgi>

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