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Conference abstract

## Age-related decline in aerobic potential in trained to well-trained cyclists

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**Abstract:** It is generally considered that an age-related decline in aerobic capacity occurs as we get older. The decline has been described to be approximately 1% per year in adult men and women, starting from the age of about 25 years. It may, however, be influenced by the activity level of the individual [1]. The aim of the present study was therefore to examine the effect of aging on aerobic potential in trained to well-trained cyclists, in a cross-sectional study.

Sixteen cyclists, classified as either trained or well-trained [2], were recruited and divided into two groups depending on their age. Group 1 (G1) and group 2 (G2) were characterized by a mean age of 27.9±5.9 and 53.8±5.2 years, respectively ( $p<0.001$ ). Body mass was 75.7±10.7 and 78.9±9.6 kg in G1 and G2, respectively (NS). G1 trained 4.5±1.4 times and 10.3±4.9 h per week while G2 trained 4.6±2.5 times and 8.6±5.4 h per week at the time just before the start of the study (NS). Anaerobic threshold (AT) was measured using a continuous incremental test starting at 140 W and increasing by 40 W every 5th min, until a blood lactate concentration of 4 mmol per L was reached. Later, maximal watt ( $W_{max}$ ) was measured in a continuous incremental test starting at 200 W and increasing by 25 W every min, until exhaustion.

The primary result of the present study was that G2 showed a significantly lower  $W_{max}$  of 333±40 W as compared to 380±32 W for G1 ( $p=0.019$ ) as well as lower AT of 259±34 W as compared to 300±21 W for G1 ( $p=0.013$ ). These differences correspond to on average 12% and 14% lower values for G2, respectively. Taking the average difference of 26 years between the two groups into account, the average differences in  $W_{max}$  and AT between the groups correspond to declines of 0.5% per year.

An age-dependent decline in aerobic capacity should be expected, regardless of activity level. However, the present results indicate that the older participants in the study managed to limit the textbook-based expected age-related decline of 1% per year quite a bit when considering the aerobic potential measurements of  $W_{max}$  and AT.

In conclusion, differences in  $W_{max}$  and AT were observed between younger and older trained to well-trained cyclists, in favour of the younger. The result occurred regardless that the two groups of cyclists were matched for performed training at the time just before the start of the study as well as body mass. The age-related difference in aerobic potential measurements was on average about 13%, which corresponds to a decline of 0.5% per year lived.

**Keywords:** Aerobic capacity; Cycling; Health; Physical Performance; Work capacity

References:

1. McArdle, W. D., Katch, F. I., & Katch, V. L. (2015). *Exercise physiology: Energy, nutrition, and human performance* (p. 855). Philadelphia: Lippincott Williams & Wilkins
2. Jeukendrup, A. E., Craig, N. P., & Hawley, J. A. (2000). The Bioenergetics of World Class Cycling. *Journal of Science and Medicine in Sport*, 3(4): 414-433

