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Effect of post-exercise increase in creatine-kinase activity on performance parameters in Standardbred racehorses.

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In equine sports medicine, the most considered performance parameter is the Onset of Blood Lactate Accumulation (OBLA), fixed at 4 mmol/L (Courocè-Malblanc et Hodgson, 2014). Nevertheless, in human medicine several methods to define individual Lactate Threshold (LT) were developed (Faude et al., 2009). Horses with poor performance were reported to have post-exercise creatine-kinase (CK) activity higher than good performer (Fraipont et al., 2011). Aim of the study is to evaluate LTs calculated by different methods in horses with increased post-exercise CK activity.

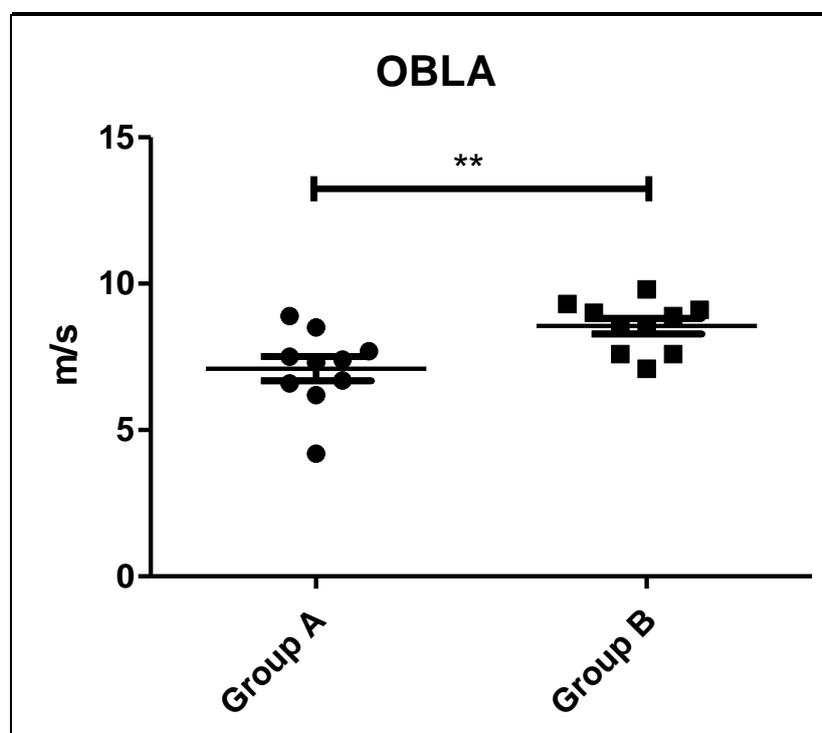
Data from a cohort of Standardbred racehorses that underwent clinical exercise testing, including incremental treadmill test with plasma lactate analysis at different speed steps, were retrospectively collected. A blood sample was collected 6hrs post-exercise and CK activity was evaluated with spectrophotometric method. A case group (group A) of 10 horses (3.1±1.0 y.o.) that did not present any other alteration potentially influencing performance than post-exercise CK activity greater than reference value (>735 U/L) was selected (Valli, 2017). An age-matched and sex-matched control group (group B) of 10 horses with no alteration potentially influencing performance and normal post-exercise CK activity was selected. Lactate concentrations obtained during treadmill test were analysed with a dedicated software (Newell et al., 2009) and LT was determined by the following methods: a) Inflection Point, i.e. the point of intersection between two linear splines, b) Lactate Threshold by logarithmic transformation, c) OBLA and

d)Initial Rise of 1 mmol/L post baseline. Values of different LTs from the two groups were compared by means of unpaired t-test.

Statistical analysis showed that OBLA was significantly lower ($p=0.009$) in group A when compared to group B. No differences between the two groups were observed for other LTs values (Figure 1).

Results confirm that horses with elevated post-exercise CK activity, probably due to muscle damage, have worse performance compared to controls. Moreover, OBLA seems to be the more appropriate parameter for performance profiling in racehorses.

Figure 1: Difference in OBLA values between group A and group B (**= $p<0,01$)



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