Maximal lactate steady state in swimming tethered #27

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This study investigated whether aerobic capacity (AC) in tethered swimming corresponds to maximal lactate steady state (MLSS) and its correlation with 30 min (V30) and 400m (V400) free swimming velocity. Twenty-five swimmers were submitted to an incremental tethered swimming test (ITS) with each stage lasting 3 minutes, initial load 20N, with 10N increments and a 30s interval to collect blood samples and lactatemia ([La$^-$]). The abrupt increase in [La$^-$] against force (F) corresponded to AC (AC$_{BI}$). The points obtained for [La$^-$] against force (N) were adjusted with an exponential curve model to determine AC corresponding to 3.5mmol.l^{-1} (AC$_{3.5}$) and 4.0mmol.l^{-1} (AC$_{4.0}$). Later swimmers performed maximum exercise for 30 minutes (V30) and 400m (V400) in free swimming. After one week, nine swimmers performed three random 30 minute tethered swimming exercises with 90%, 100%, and 110% intensity AC$_{BI}$ MLSS. Comparisons between ACs (AC$_{3.5}$, AC$_{4.0}$, and AC$_{BI}$) were made by the one-way Anova test. Pearson correlation was used for possible correlations between ACs and between ACs and V30 and V400 ($p<0.05$). No significant differences were found between AC$_{BI}$ (54.10±10.39N), AC$_{3.5}$ (54.19±14.01 N), and AC$_{4.0}$ (56.10±10.39 N). The 100% CA$_{BI}$ verified MLSS. Also all ACs significantly correlated with V30 (r>0.91) and V400 (r>0.63). We can conclude that AC$_{BI}$ corresponds to MLSS and both individually determined. AC and from the fixed lactate concentrations (3.5 and 4mM) can be used to predict mean 30 minute and 400m free swimming velocity.

Key words: swimming; aerobic capacity; system of data acquisition; load cell; elastic cord.