

Evaluation of the Lactate Pro™ Blood Lactate Test Meter.

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Objective

To determine the validity and reliability of the Lactate Pro™ blood lactate test meter and its strength of association with the YSI 1500 Sport lactate analyzer.

Design

A simple comparative design involving two analytical systems examining the same series of sample.

Setting

Study of local volunteers recruited via word-of-mouth and notice board 'flyers', in Calgary, Alberta.

Participants

Seven male and five female volunteers participated in this study (Age; 26.7±5.4 yr, Mass; 73.8±6.9 kg, $\dot{V}O_2$ max ; 51.3±6.8 ml·kg⁻¹·min⁻¹) were recruited. All 12 participants completed the study. All subjects were informed of the purposes of the study and associated risks as required by the Human Ethics Committee, Faculty of Kinesiology, at the University of Calgary.

Intervention

The subjects initially performed a typically graded cycle ergometer test to exhaustion while a computerized metabolic measurement system assessed gas exchange parameters. The power output at which $\dot{V}O_2$ max was attained was

then used to establish the workloads for the protocol used on a second occasion to bring about various blood lactate concentrations (B[La⁻]). This second protocol required the subjects to perform five 3-minute ascending workloads (25, 50, 75, 100 & 115% of the power output at $\dot{V}O_2$ max), separated by 2 minutes of passive rest until the final rest period which was extended to 5 minutes. Fingertip blood samples (approximately 100 µl) were taken in the final 5 seconds of each cycling phase for analysis by the two systems.

Main outcome measures

The two analyzers were then assessed for their comparative performance via linear regression and 'limits of agreement' analyses. A separate analysis for reliability of the Lactate Pro™ was performed from blood samples randomly taken at a low and high work intensity and repeated 10 times.

Main results

Linear regression analysis of all samples gained from the Lactate Pro™ vs. the YSI produced a regression equation of $y = 1.067x + 0.036$ ($r = 0.984$; $p < 0.01$). The limits of agreement (via Bland-Altman) revealed that 4 of 60 samples fell outside of 2 standard deviations of the bias (all greater than 7 mmol·L⁻¹ B[La⁻]), with the bias being 0.46 (1.01) mmol·L⁻¹ and the limits being 0.21 – 0.73 mmol·L⁻¹. The 'repeated' analyses of the low and high B[La⁻] samples produced coefficients of variation of 5.23% and 8.64% respectively.

Conclusions

It would seem that the Lactate Pro™ agrees closely with the YSI 1500, at least over the range of B[La⁻] examined in this investigation. It is easy to use, requires only a small blood sample, allows for rapid evaluation (60 seconds), and is relatively cost effective (approximately \$2.00

per sample, once the actual unit has been purchased). Further work is warranted to decisively examine B[La⁻] samples greater than 8 – 10 mmol·L⁻¹.

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