

## Test Retest Reproducibility of a Hand-Held Lactate Analyzer in Healthy Men

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### Abstract

The objective of the present study was to evaluate the test-retest reliability and day-to-day precision of a hand-held Blood Lactate Analyzer. Blood lactate levels were evaluated on 12 samples of human beings and blood was collected from both ring and middle finger for test-retest reliability. Day-to-day precision was determined by known concentration of two aqueous lactate control solutions once a day for 10 consecutive days. Results showed high test-retest reliability ( $r = 0.948$ ; mean  $2.41 \pm 0.86$  in ring and  $2.45 \pm 0.76$  in middle finger) and high day-to-day reliability ( $r = 0.998$ ; mean  $1.1 \pm 0.08$  in low control and  $4.28 \pm 0.24$  in high control solution). The results were similar to those previously reported. The results of this study support the use of the hand-held device in healthy human beings.

**Key Words: Test-Retest, Reliability, Blood Lactate, Portable Analyzer**

### Introduction

Measurement of blood lactate has many important applications. In clinical setting, it helps to identify the disease severity (Planche et al., 2001; Saunders et al., 2005; Tennent-Brown et al., 2007; Thorneloe et al., 2007), prognosis (Coghe et al., 2000), and treatment efficacy (Ivers and Mukherjee, 2006) in many conditions. In sports settings, it also helps to identify an optimal training intensity (Bishop, 2001) and proper recovery to reduce chances of injury occurrence, as the increased lactate level seems to inhibit certain enzymes so as to create fatigue.

Traditionally, measurements of lactate have been made by using large laboratory based analyzers that are expensive and cumbersome – need of lactate transportation, centrifugation, storage in ice (refrigeration) etc, all of which requires higher technical knowledge from user (Thorneloe et al., 2007). In sports, ideally the lactate

concentrations should be measured during a training session and reported immediately to the athlete to ensure the desired training intensity (Bishop, 2001). But the above said limitations of the large laboratory based equipments tend to limit their usage in the field during training. The essential qualities of any tool are that they provide accurate and reliable results in a rapid and simple manner. With the advent of less expensive, rapid hand-held lactate analyzers that have proved accurate in animals (Coghe et al., 2000; Tennent-Brown et al., 2007; Thorneloe et al., 2007), critically ill human beings (Planche et al., 2001; Ivers and Mukherjee, 2006), even in sportsmen (Bucklay et al., 2003; Pyne et al., 2005), lactate measurement is likely to increase in sports community in order to improve performance, facilitate recovery and reduce the chances of injury.

Thus, the purpose of the present study was to see test-retest reliability of Lactate Plus hand held analyzer in healthy