



## Mid Atlantic Regional Chapter of the American College of Sports Medicine

46<sup>th</sup> Annual Scientific Meeting, November 3<sup>rd</sup> - 4<sup>th</sup>, 2023  
Conference Proceedings

International Journal of Exercise Science, Issue 9, Volume 12



### A Standardized 5-Sec Alactic Time Does Not Improve The Reliability Of A 15-Sec Maximal Glycolytic Capacity (Vlamax) Test For Cycling

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**PURPOSE:** Glycolytic (aka, “anaerobic”) ability has been shown to impact endurance performance and could be used to steer training. VLaMax is used to estimate the maximal rate of glycolysis. However, recent work suggests it may not be suitably reliable for some of its applications. The purpose of this study was to ascertain if the reliability of a 15-sec sprint cycling test in men and women could be improved by using a standard 5-sec alactic time (Talac).

**METHODS:** Eighteen men and twelve women completed two sprint sessions over 1-week. A 10-min warm-up preceded a pretest 3  $\mu$ l blood lactate (BLC) sample, after which a maximal 15-sec sprint was completed; cyclists then rested passively while multiple blood lactate samples were taken until levels peaked. VLaMax was calculated as **(Peak BLC – Pre BLC) \* (15-sec – Talac)-1**; in this study Talac = 5 (sec), rather than the time point where power drops to 96.5% of peak. Differences across trials were analyzed using a paired-sample t-test, Pearson correlation, ICC, and Bland-Altman analysis with an  $\alpha$  of 0.05 for all tests; data are reported as mean  $\pm$  sd.

**RESULTS:** Power (W) was similar across trails ( $773.0 \pm 143.5$  vs.  $758.2 \pm 127.4$ ;  $p = 0.333$ ) with a coefficient of variation (CV) of 4.7%. VLaMax ( $\text{mM}\cdot\text{L}^{-1}\cdot\text{sec}^{-1}$ ) was also similar ( $0.727 \pm 0.235$  vs  $0.682 \pm 0.237$ ;  $p = 0.199$ ), but only moderately reliably across trials with a CV and ICC of  $16.6 \pm 13.2\%$  and 0.636 [0.457, 0.765], respectively. **CONCLUSION:** Despite using a standard estimate for Talac, the 15-sec VLaMax cycling sprint remains only moderately reliable. It is likely heavily affected by even small variations in the measured lactate values used in the calculation.

**SIGNIFICANCE/NOVELTY:** Despite the scientific underpinnings, this study raises further questions about the use of VLaMax for precise athlete screening and training prescription. The reliability of current VLaMax test procedures may not be reliable enough to use as currently suggested.