IS THERE A RELATIONSHIP BETWEEN IPAQ+ SCORES AND BLOOD LACTATE LEVELS FOLLOWING STEADY-STATE AEROBIC ACTIVITY? Hayley Pettigrew ^{1, 2}, Cassidy Klein¹, and Shaun Boe ^{1,2}

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INTRODUCTION

Lactate is a metabolic by-product which accumulates in the periphery during anaerobic metabolism. Research suggests increased blood lactate concentration increases brain excitation and neuroplasticity via the upregulation of neurotransmitters and other neuromodulatory agents, including brain-derived neurotropic factor (BDNF).

Assessing blood lactate concentration is challenging, given the necessity for specialized equipment and need to sample blood. Having a more feasible means to understand how physical activity may impact blood lactate concentration would aid in the prescription of physical activity that would optimize blood lactate concentration, improving the ability to derive positive benefits for the brain.

Here we explore if the IPAQ+, a self-report assessment of physical activity, has a relationship with the change in blood lactate concentration from pre- to post-exercise.

We hypothesized that metabolic equivalents (METs) derived from the IPAQ+ would have a negative relationship with blood lactate concentration, such that participants with higher METs values would have a smaller change pre-post exercise.

METHODS (n=19, 11 females, aged 23.5 ± 2.4 years)

Inclusion Criteria

- Between the ages of 18-40 years
- Healthy/ Safe to Exercise as determined by the PAR-Q+
 - No heart or lung conditions
 - Non-smoker
- No issue with giving blood
 - No aversion to needles
 - No aversion to blood sampling

International Physical Activity Questionnaire (IPAQ+)



The IPAQ+ is a self-report measure used to determine how physically active an individual is. The questions asked are used to categorize a person's weekly activities in METs, based on:

- Intensity (light, moderate and vigorous)
- Duration
- Sedentary time

METHODS (Continued)

The IPAQ+ is calculated by estimated resting energy expenditure:

- Vigorous physical activity is 8 times more exertion than at rest
- Moderate physical activity is 4 times more exertion than at rest
- Light physical activity is 3.3 times more exertion than at rest

SESSION ONE



SESSION TWO



STATISTICAL ANALYSIS (Prism 9, v 9.5.1)

- Change in blood lactate concentration determined by subtracting pre- from postexercise values for each participant
- Data tested for normality using the D'Agostino and Pearson test
- The relationship between change in blood lactate concentration and METs value was determined using a Spearman correlation (p=0.05)

Participants performed a graded, maximal exercise test to exhaustion to determine their peak power output (PPO)

Exhaustion Criteria

- Age predicted max heart rate (206.9 - (0.67))(age)) = 95%
- Rating of perceived exertion (RPE) of 17-20 on the Borg scale

RESULTS

- The average METs score was 5565.8 ± 3358.2 (1519 15648) • The average Δ in blood lactate concentration (pre-post exercise) was 1.3 \pm 1.4 (-
- 0.91 4.62
- Δ blood lactate concentration was normally distributed • METs scores were not normally distributed
- There was a significant relationship between METs score and Δ blood lactate (p=0.0419)
- METs score and Δ blood lactate were negatively correlated (r = -0.4708), meaning participants with a higher METs score would have lower blood lactate levels, and participants with a lower METs score would have a higher blood lactate level (*Figure*



Figure 1. Negative moderate correlation of IPAQ+ (METs) scores and change in blood lactate (mmol/L).

DISCUSSION

- Δ blood lactate concentration
- This finding suggests that the IPAQ+ may be a useful tool to help determine the relationship between physical activity and blood lactate levels without the need for specialized equipment
- The findings should be considered in the context of several limitations:
 - The IPAQ+ is prone to recall bias and may not truly represent a participant's energy expenditure over the prior 7-day period
 - The IPAQ+ does not necessarily distinguish between different forms of exercise (aerobic vs. anaerobic); for example, large amounts of low-intensity exercise result in similar METs as small amounts of vigorous exercise

AFFILIATIONS/FUNDING

LABORATORY FOR BRAIN RECOVERY AND FUNCTION SCHOOL OF PHYSIOTHERAPY



• The data confirms our hypothesis that there is a relationship between the IPAQ+ and



