I. BACKGROUND

- Colon, breast, and prostate cancer risks can be reduced by physical activity, but assessment methods are self-reported, crude, and often imprecise.
- Better objective methods are needed to improve the validity and reliability of non-invasive physical activity measurement devices.
- Furthermore, specific activity prescriptions should be individualized and require improvements in assessment protocols.

II. PROPOSED MODEL

- As part of an overall model, cycling has been proven successful in physical activity assessment, due to its applicability from rehabilitation populations to elite athletes.
- The purpose of this study was to compare the traditional predictive threshold powers from blood lactate sample lactate thresholds (LT1 & LT2) and ventilatory thresholds (VT1 & VT2) to the Aerobic Threshold (BSX AT) and Anaerobic Threshold (BSX LT) via a wearable BSXInsight device which uses non-invasive Near Infrared Spectroscopy (NIRS).

III. METHODS

Male (n=9) subjects. Age (21.25 ± 8.4 years), Weight (72.81 ± 31 kg).
- Exercise at increasing powers until exhaustion in 3 minute steps.
- LT1 defined as increase of 1 millimolar of lactate from baseline
- LT2 at increase of 1.5 millimolals of lactate from baseline
- VT1 at breakpoint of VCO2 vs. VO2 [Modified V-Slope]
- VT2 at breakpoint of VE vs. VCO2 [Modified V-Slope]
- Pearson Correlations between VT1 vs. BSX AT, and VT2 vs. BSX LT
- Pearson Correlations between LT1 vs. BSX AT, and LT2 vs. BSX LT

IV. RESULTS

<table>
<thead>
<tr>
<th></th>
<th>Correlation (R)</th>
<th>P-value</th>
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<tbody>
<tr>
<td>LT1 vs. BSX AT</td>
<td>0.931</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>LT2 vs. BSX LT</td>
<td>0.909</td>
<td>&lt; 0.02</td>
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<tr>
<td>VT1 vs. BSX AT</td>
<td>0.952</td>
<td>&lt; 0.05</td>
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<tr>
<td>VT2 vs. BSX LT</td>
<td>0.893</td>
<td>0.055</td>
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V. CONCLUSIONS

- Previous work (Borges, 2015) has compared the reliability of the BSXInsight versus blood lactate samples in a running population.
- Our work extends this idea into the cycling population.

VI. CONCURRENT & FUTURE STUDIES

- Predicting the Expenditure of AWCexp Based on Changes to the T-v Curve (Karlee Edwards)
- Modeling of real-time power output based on wearable, non-invasive NIRS device (Clemson Univ.)

VII. REFERENCES


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