Acute Responses to High Intensity Interval Exercise and Moderate Aerobic Exercise on Anaerobically and Aerobically Trained Athletes

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ABSTRACT
High Intensity Interval Training (HIIT) is emerging as a popular method of training recently for its ability to deliver an exercise that still elicits almost the same health benefits, when compared to traditional methods of training. Those who are trained due to higher lactate thresholds than those who are not trained. However, there is little research on males who are trained as anaerobically or aerobically, and their differences on lactate or blood glucose recovery (3). PURPOSE: The purpose of this study is to compare the acute effects of high intensity interval exercise and moderate aerobic exercise on lactate acid and blood glucose levels on athletes who are either anaerobically trained or aerobically trained. METHODS: The HIIE is a 4 x 4 trial in which the subject pedaled on a cycle for four intervals of 4 minutes at 90-95% of maximal aerobic capacity (VO2max), interspersed with 3 minutes of active recovery at 60%VO2max. The subjects were assessed for blood lactate and blood glucose via finger stick prior to exercise, at minute 4, 13, 24, 32 and every 10 minutes post-exercise up to 30 minutes following the cessation of the exercise bout. The subjects also participated in a moderate aerobic trial (Mod) at 60% of VO2max. RESULTS, cont.

Treatments. The HIIE is a 4 x 4 trial in which the subject pedaled on a cycle for four intervals of 4 minutes at 90-95% of maximal aerobic capacity (VO2max), interspersed with 3 minutes of active recovery at 60%VO2max. The subjects were assessed for blood lactate and blood glucose via finger stick prior to exercise, at minute 4, 13, 24, 32 and every 10 minutes post-exercise up to 30 minutes following the cessation of the exercise bout. The subjects also participated in a moderate aerobic trial (Mod) at 60% of VO2max. The subjects were assessed for blood lactate and blood glucose via finger stick however time points are varied per subject due to variations in total work outputs. RESULTS. The main effect for recovery was not significant in lactate when comparing training status across both HIIE/Mod (Ana=92.5 ± 1.2, Aer=92.6 ± 1.3) and Mod=6.9 ± 2.0 mg ∙ dl⁻¹, Aer=102.7 ± 12.5 mg ∙ dl⁻¹ (p=0.2350). The main effect for lactate when comparing lactate across intensity was not significant (Ana=6.2 ± 1.2 mmol ∙ L⁻¹, Aer=5.7 ± 2.3 mmol ∙ L⁻¹, Aer-Mod=9.2 ± 1.6 mg ∙ dl⁻¹, Aer-Mod=9.2 ± 1.6 mg ∙ dl⁻¹ (p=0.5620). The main effect for glucose when comparing cue intensity across intensity (HIIE/Mod) was not significant (Ana=53.2 ± 20.1 mg ∙ dl⁻¹, Aer=61.2 ± 20.1 mg ∙ dl⁻¹, Aer-Mod=53.2 ± 20.1 mg ∙ dl⁻¹, Aer-Mod=53.2 ± 20.1 mg ∙ dl⁻¹ (p=0.2180) CONCLUSIONS: Although lactate and glucose were not statistically significant in this study, when comparing the values, anaerobically trained males buffered lactate more efficiently than those who are aerobically trained. This might suggest that individuals who are anaerobically trained possess higher lactate threshold than those who are aerobically trained.

RESULTS

Table 1: Subject Demographics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
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<tbody>
<tr>
<td>Age</td>
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<tr>
<td>Body Mass (kg)</td>
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<td>Body Fat (%)</td>
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<tr>
<td>VO2max (mL ∙ kg⁻¹ ∙ min⁻¹)</td>
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The main effect for recovery was not significant in lactate when comparing training status across both conditions (Ana=93.5 ± 2.1 mg ∙ dl⁻¹, Aer=102.7 ± 12.5 mg ∙ dl⁻¹). However, there is little research on males who are trained as anaerobically or aerobically, and their differences on lactate acid or blood glucose recovery.

PRACTICE-SCIENTIFIC IMPACT: Although this was not statistically significant, anaerobically trained males had lower blood lactate responses after recovery. (p=0.3470)

CONCLUSIONS

Although lactate and glucose were not statistically significant in this study, when comparing the values, anaerobically trained males buffered lactate acid more efficiently post-exercise than those who are aerobically trained. This might suggest that individuals who are anaerobically trained possess higher lactate threshold than those who are aerobically trained. Perhaps, if a larger sample size was utilized then the results would have been statistically significant when comparing anaerobic and aerobically trained males. Regardless, the information from this study is useful when implementing HIIT training protocols for trained individuals by eliminating the need to alter the protocol based on training status in relation to the association of fatigue with lactic acid.

REFERENCES