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The Effect of Relative Intensity on the Magnitude and Duration of Analgesia Following Acute Exercise

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Exercise (EX) induced analgesia has been previously identified. However, the EX prescription necessary to elicit analgesia is not consistent. Additionally, the duration of the analgesic effect following EX bouts is unknown. **PURPOSE:** To determine the effect of EX intensity on the duration of EX induced analgesia. Secondly, to quantify the duration of EX induced analgesia following an acute bout of cycling. **METHODS:** Ten college aged students (4 men; 6 women; age = 20.1 ± 3.1 years) underwent 30 minutes of EX on a cycle ergometer. Following 5 minutes of light cycling (3-4 METS) each subject underwent 20 minutes of cycling at 8 METS followed by a 5-minute cooldown. Workload was titrated to ensure each subject can finish the EX session. Following the EX, each subject remained seated on the cycle for an additional 15 minutes. Oxygen consumption (VO₂) was measured throughout the EX and recovery period. Minimal pain threshold (MPT) was measured using a pain pressure threshold algometer placed on the extensor carpi radialis of each subject at baseline (BSL) 0min, 5min, and 15-mins post EX. Blood lactate (BL) was also measured at these same time points. Change in MPT (Pre vs 0min Post EX) was quantified using a two-tailed Student's T-Test. The effect of sex on MPT over time was quantified using a 2 x 2 ANOVA. A Pearson's correlation was used to evaluate the relationship between MPT vs. BL, respiratory exchange ratio (RER), and VO₂ following exercise. **RESULTS:** For all subjects, MPT was greater 0min post-EX (53.3 ± 5.5 N) compared with BSL (31.8 ± 6.1 N) (P<0.05). Females had a greater increase in MPT (29.6 ± 3 ΔN) relative to males (15.7 ± 8.6 ΔN; p<0.05). Further, MPT increased in a linear fashion when compared with RER (R² = 0.43) and BL (R²=0.56; P <0.05). MPT remained higher than BSL at 5mins (48 ± 6.3 N) and 15mins (44.4 ± 5.7N) post-EX relative to BSL. Sex differences in MPT remained at both 5 and 15mins (P<0.05). The correlation between MPT vs. BL and RER at 5 (BL, R² = 0.59; RER, R² = 0.47; P<0.05) and 15 minutes (BL, R² = 0.67; RER, R² = 0.52; P<0.05) remained. **CONCLUSION:** Twenty minutes of vigorous EX induces analgesia for at least 15 minutes following exercise. This effect seems to be sensitive to relative EX intensity. These findings may be useful in reducing patient pain levels without the need for pharmaceuticals.