8. SWACSM Abstract

Impact of High Intensity Interval Training Versus Moderate Intensity Continuous Training on Critical Power

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ABSTRACT

Critical Power (\( P_{\text{CRIT}} \)) is the greatest power that a person can sustain for prolonged periods of time while maintaining steady-state, submaximal aerobic conditions. Work-prime (\( W' \)) is the amount of work that can be tolerated when exercising in non-steady-state conditions above \( P_{\text{CRIT}} \). PURPOSE: Compare the effect of equal amounts of moderate intensity continuous training (MICT) and high intensity interval training (HIIT) on \( P_{\text{CRIT}} \) and \( W' \). METHODS: Twenty-two (10 female) untrained, young adults completed 8 weeks of cycling training (40 minutes, 3x per week) administered as either MICT (44% max power achieved during a graded exercise test; \( P_{\text{GXT}} \)) or HIIT (4 bouts at 80% \( P_{\text{GXT}} \) for 4 minutes with recovery intervals between). \( P_{\text{CRIT}}, W' \) and other physiological variables were determined before and after training. RESULTS: \( P_{\text{CRIT}} \) significantly increased in both groups, but to a greater extent in the HIIT group (MICT: 15.7 ± 3.1% vs. HIIT: 27.5 ± 4.3%; \( P=0.04 \)). \( W' \) was not consistently impacted by training (\( P=0.76 \)). The training-induced change in \( P_{\text{CRIT}} \) was not significantly related to the training-induced change in \( \dot{V}O_2\text{MAX} \). The training-induced increase in \( P_{\text{CRIT}} \) was related to how intense the training was relative to \( P_{\text{CRIT}} \), with those performing the same workout at a greater % \( P_{\text{CRIT}} \) exhibiting greater training-induced increases in \( P_{\text{CRIT}} \) (\( R^2=0.49, P<0.01 \)). CONCLUSION: HIIT elicits approximately twice the increase in \( P_{\text{CRIT}} \) than an equal amount of MICT in untrained young adults. Training-induced increases in \( P_{\text{CRIT}} \) are not dependent upon changes in \( \dot{V}O_2\text{MAX} \). Exercise may be more effectively prescribed and described relative to \( P_{\text{CRIT}} \), rather than \( \dot{V}O_2\text{MAX} \) or \( P_{\text{GXT}} \).