

Comparison Of Oxygen Consumption In 4-second Sprint Interval Exercise with Varied Intensity and Rest Period

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ABSTRACT

Sprint interval training (SIT) is usually performed at maximal 'all-out' intensities, that are 5-8-times higher than the power needed to elicit VO_{2peak} . However, the % VO_{2peak} associated with repeated submaximal power sprints (% P_{max}), particularly when paired with varying rest periods, remains unknown. Investigating the % VO_{2peak} in repeated submaximal power sprints is pivotal, enabling the personalization of workout routines to specific training goals. **PURPOSE:** The aim of this study was to systematically investigate the acute physiological responses induced by three levels of % P_{max} intensities (50%, 75%, and 100% of P_{max}) with three varying rest periods (15, 30, and 45-s) between thirty 4-s sprints. **METHODS:** Nine healthy (25 ± 4.9), recreationally active participants took part in nine trials, performing thirty 4-s sprints during cycling with inertial loading at three different intensities and rest periods, in randomized order. **RESULTS:** Power outputs varied across differing intensities and rest periods. At $52\pm 0.7\%$ P_{max} and $74\% \pm 0.3\%$ P_{max} , the average output was constant within the rest periods. However, the 'all-out' efforts revealed that 15-s rest elicited a lower ($p < 0.05$) % P_{max} of $88\pm 9.0\%$ P_{max} compared to $95\pm 3.9\%$, and $96\pm 5.7\%$ of P_{max} for 15 vs. 30, and 45-s of rest ($p < 0.05$). VO_2 varied ($p < 0.05$) across all rest periods: $48\pm 11.3\%$, $66\pm 13.2\%$, $84\pm 13.5\%$ of VO_{2peak} for 15-s rest; $35\pm 5.8\%$, $45\pm 10.5\%$, $66\pm 12.2\%$ VO_{2peak} for 30-s rest; and $28\pm 6.7\%$, $33\pm 5.7\%$, $54\pm 9.8\%$ VO_{2peak} for 45-s rest, corresponding to intensities at 52%, 74%, and 88% of P_{max} , respectively. Notably, a linear regression model identified the equation for VO_2 (mL/min) = $1088.89 + 28.32(\%P_{max} \text{ intensity}) - 38.75(\text{rest in s})$ ($R^2 = 0.91$). **CONCLUSION:** A wide range of VO_2 responses (i.e., 28-84% VO_{2peak}) can systematically be elicited by varying the intensity and rest period during repeated 4-s sprints cycling using inertial loading, offering valuable insights for designing personalized training regimens.

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