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Variability of Aerobic Performance in the Laboratory and Its Physiologic Correlates

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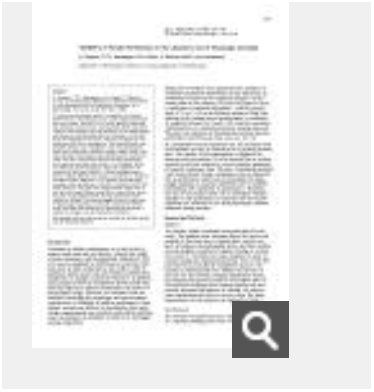
Abstract

To study the physiologic basis of variability of physical performance in the laboratory, ten male subjects were studied once a week, during a 9-12 month period. Previously, the reference maximal work load attained (Wref) was determined in each subject. The test protocol of the actual study was based on the individual Wref and started at 70% Wref for 5



min whereupon the work load was increased by 5% Wref every 2.5 min to exhaustion. The maximal work load attained (Wmax) was considered as the test performance. Heart rate, respiratory variables, oxygen uptake (VO_2), and blood lactate concentration were determined at each work load. The rate of perceived exertion during submaximal and maximal work was also scored. In all subjects, Wmax and VO_2max varied randomly, while the coefficient of variation in VO_2max (4.20%-11.35%) exceeded that in Wmax (2.95%-6.83%). No seasonal influences on VO_2max and Wmax were observed. In all subjects the physiologic variables, when plotted as a function of external work load, were shifted to the right with higher Wmax values and to the left with lower Wmax values. With lower Wmax values, the rate of perceived exertion during submaximal work tended to increase. The results suggest that the magnitude of physiologic responses to exercise is related to relative work load and that variability of physical performance is related to changes in gross mechanical efficiency.

Key words

exercise - performance - variability - aerobic power - rate of perceived exertion

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