HEAD-DOWN POSTURE REDUCES PEAK OXYGEN UPTAKE IN EXERCISE

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The aim of this study was to investigate the effects of head-down posture in response to metabolic potentials in seven healthy young subjects. They underwent an incremental exercise until their exhaustion in the three posture conditions (supine (SUP), -20 degree head-down (HD), and +70 degree head-up (HU)). Pulmonary oxygen uptake (VO2) at peak exercise was significantly decreased at HD compared to those under SUP and HU conditions. In addition, the deoxygenation indexes (% delta-deoxy-Hb at peak exercise/steady-state delta-deoxy-Hb during arterial occlusion) at HD was significantly greater than under HU and SUP conditions, suggesting that HD occurred in the arterial ischemia into working muscles. At submaximal work rates, the time course of VO2, VCO2, and VE were similar among the three posture treatments, even though the exhaustion occurred at significantly different time points (and thereby work rates). A close significant correlation between the deoxygenation indexes and VO2 at peak exercise was observed. These findings provide the evidence that the ischemia into working muscles is produced by head-down posture and leads to lower peak VO2 to exercise.

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