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Title: Effects of head-out water immersion on cardiorespiratory responses to maximal cycling exercise

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Abstract: Our objectives were to determine effects of head-out immersion (HOI), scuba breathing, and water temperature on cardiorespiratory responses to maximal aerobic work. Measurements of VO₂, VE, and heart rate (HR) were obtained on seven men (27 yr, 177 cm, 67 kg) as they performed the same upright bicycling exercise to exhaustion (4-5 min) in 23 degrees C air and 30 degrees C water. Maximal oxygen uptake (VO₂ max) during HOI was 3.18 liters - min⁻¹, which was not statistically different from the mean of 3.29 liters- min⁻¹ in air. When compressed air was breathed via scuba during HOI, VO₂ max was 3.12 liters- min⁻¹ and not significantly different from that when room air was breathed and a low-resistance valve in water was used. HOI decreased VE by 15.7 liters - min⁻¹ and HR by 10 beats (b) - min⁻¹. Scuba breathing further reduced VE by 22.0 liters - min⁻¹. Similar measurements were made on four of the subjects after 18 min of HOI in water temperatures of 35,30, and 25 degrees C. Water temperature had no significant affect on VO₂ max, although HR was 8 b- min⁻¹ lower in 30 degrees C and 15 b - min⁻¹ lower in 25 degrees C as compared to 35 degrees C water. The results show that VO₂ max was not significantly changed by HOI, scuba breathing, or brief exposures to 25, 30, and 35 degrees C water, despite significant reductions that occurred for VE and HR. Adult Body

Temperature *Exertion Head Heart/*physiology
Heart Rate Human *Immersion Male Maximal
Voluntary Ventilation Naval Medicine Oxygen
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