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Title: Lack of diurnal effects on periodic exercise during prolonged cold water immersion

Authors: Doubt, TJ
Smith, DJ

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Abstract: Diurnal effects on periodic exercise were examined in 8 male divers wearing passive thermal protection during whole body immersions in 5 degrees C water for periods of up to 6 h. Studies were done during the course of 5-day air saturation dives at a depth of 1.61 ATA, with immersions beginning at 1000 h (AM) and 2200 h (PM). During each hour of immersion, leg exercise was done for 3 min each at workloads of 50, 70, and 90 W. Heart rate (HR) at each workload increased uniformly with immersion time, without a change in slope of HR vs. workload. No AM or PM differences occurred. AM resting VO2 increased linearly, and to the same extent as PM, with exposure time. VO2 at 50 W also increased at the same rate as resting values. VO2 at 70 and 90 W were similar for AM and PM and did not vary significantly during the 6-h immersions. Temporal increases in exercise HR may reflect cardiac compensation of diminished plasma volume. Workloads greater than or equal to 70 W generate enough metabolic heat in this specific condition to meet the thermogenic requirement. Lack of diurnal effects on exercise variables may be due to environmental conditions suppressing circadian rhythms.

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