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## Cardiovascular Responses of Pregnant Women During Aerobic Exercise in Water: A Longitudinal Study

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### Abstract

To determine the effects of pregnancy on the cardiovascular responses to immersion and exercise in water, 12 women completed 20 min of immersion and 20 min of bicycle ergometry at 60% predicted  $VO_2$ max

in 30 °C water during their 15th, 25th, and 35th week of pregnancy as well as 8-10 weeks post partum. Immersion lowered the resting heart rate approximately 8 bts/min ( $P < 0.05$ ). Exercise in water also resulted in a lower heart rate as compared with the same level of exercise on land ( $132 \pm 4$  vs  $149 \pm 6$  bts/min;  $P < 0.05$ ). Both the rest and exercise heart rate responses were independent of duration of pregnancy or pregnancy status. Post partum exercise cardiac output averaged  $9.9 \pm 0.4$  l/min, significantly lower ( $P < 0.05$ ) than the 15th ( $12.7 \pm 0.5$ ), 25th ( $14.7 \pm 0.5$ ), or 35th week ( $15.1 \pm 0.7$  l/min). Total peripheral resistance was greatest ( $P < 0.05$ ) post partum ( $657 \pm 29$  dyn·s/cm<sup>5</sup>) compared with either the 15th ( $515 \pm 27$ ), 25th ( $407 \pm 18$ ), or 35th week ( $450 \pm 23$ ). The results indicate that exercise in water lowers the heart rate compared with land exercise at the same metabolic rate. The combined effect of exercise, water, and pregnancy may elevate the cardiac output more than expected on land, but the same general pattern of exercise response will be evident throughout the duration of pregnancy. The results further suggest that water alters the heart rate and blood pressure responses such that land-derived exercise target heart rates should not be used to prescribe exercise intensity in water.



## Key words

heart rate - blood pressure - cardiac output - total peripheral resistance - pregnancy - immersion - exercise

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