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Title: Characteristics of the response to exercise in professional saturation divers

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Abstract: Exercise testing with measurements of expired minute ventilation (VE), oxygen uptake (VO<sub>2</sub>), and carbon dioxide elimination (VCO<sub>2</sub>) was done in 63 professional saturation divers, in the screening programs for selection of divers, to 10 different experimental and operational saturation dives. Their experience as divers averaged 9.8 yr (range 1-20), and they averaged 276 days (range 5-900) in saturation. The maximal pressure they had ever been exposed to averaged 2.01 MPa (range 0.8-5.1). The divers were compared with a control group of 47 offshore workers and policemen matched for age, height, and smoking habits and with reference values for the general healthy population. There were no significant differences in peak work load achieved, VO<sub>2peak</sub> and VCO<sub>2peak</sub>. VE at VO<sub>2peak</sub> and the corresponding ventilatory equivalents for oxygen uptake (VE(peak)/VO<sub>2peak</sub>) and carbon dioxide elimination (VE(peak)/VCO<sub>2peak</sub>) were significantly higher in divers (P less than 0.05), but VE, VE/VO<sub>2</sub> and VE/VCO<sub>2</sub> were not different at lower work loads. VE(peak)/VCO<sub>2peak</sub> correlated positively with years of diving experience when corrected for age (P less than 0.01). Divers had higher tidal volumes and lower breathing frequencies at ventilations lower than 40% of VE(peak), but maximal tidal volumes were not different. Tidal volume at a VE of 30 liter.min (-1) correlated negatively with FEV<sub>1</sub> (P less than

0.05). The results are in agreement with the transient changes in pulmonary function and exercise tolerance demonstrated after a single saturation dive, and indicate that these changes may not be completely reversible.

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