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COMPARISON OF THE PHYSIOLOGICAL, COGNITIVE AND SUBJECTIVE EFFECTS OF SEA LEVEL AND ALTITUDE-INDUCED HYPOXIA

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Introduction: Exposure to hypoxia in a low-pressure chamber (LPC) is an integral part of military aviator training. Exposure to low pressure is associated with a risk of decompression sickness and other dysbarisms. A potential response to these issues is the use of "normobaric hypoxia" training. Normobaric hypoxia can be achieved by exposure to oxygen partial pressures equivalent to target altitudes through dilution of air at one atmosphere with nitrogen. A comparison of the physiologic, cognitive and subjective responses to hypobaric-induced hypoxia and normobaric-induced hypoxia has not been performed. The purpose of this study was to compare the objective and subjective effects of hypobaric and normobaric induced hypoxia, and to evaluate a Reduced Oxygen Breathing Device (ROBD) as a potentially useful adjunct to conventional hypobaric training. **Method:** Seventy male and female subjects scheduled to undergo conventional LPC hypoxia familiarization training were recruited to participate in this study. Each subject followed the LPC hypoxia training evolution with ROBD generated normobaric hypoxia. Objective and subjective data were collected from each subject under each hypoxia condition for comparison. Physiologic data collection included heart rate, arterial oxygen saturation, signal-averaged electrocardiogram, and processed electroencephalogram. Cognitive performance was assessed using the Continuous Performance Test component of the Space Cognitive Assessment Test battery. Following each hypoxia exposure period, subjects completed the Hypoxia Symptom Questionnaire. **Results:** The data suggest the physiologic, cognitive and subjective effects of hypoxia produced by breathing a reduced oxygen concentration at sea level do not differ significantly from those produced by exposure to low-pressure in an altitude chamber. **Conclusion:** The results of this study imply that the objective and subjective effects of decreasing tissue oxygenation are the same regardless of whether this decrease is produced at sea level or at altitude.