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EXECUTIVE FUNCTION AND PHYSICAL PERFORMANCE ON FLIGHT
CONTROL DEVICES DURING EXPOSURE TO NORMOBARIC HYPOXIA (82 pp.)

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Hypoxia is a physiological state defined as a reduction in the distribution of oxygen to the tissues of the body. It has been labeled as a major factor in aviation safety worldwide because of its potential disorientation. Hypoxic symptoms have been found at altitudes ranging up to 12,500 ft.; however, federal regulations allow pilots to operate aircrafts at this altitude without the use of supplemental oxygen. **Purpose:** To determine the effects of 12,500 ft. on physiology, cognition, and performance in pilots during a flight simulation. **Methods:** Ten healthy male pilots engaged in three visits including a pre-screening visit and two experimental trials. Each of the trials consisted of a 60 minute baseline period, followed by a 60 minute flight simulation period. The first visit included all baseline anthropometric variables and a graded maximum exercise test using a leg cycle ergometer. The two experimental visits included a 0 ft. normoxic trial (NORM) and a 12,500 ft. hypoxic trial (HYP). Physiological data including heart rate (HR), oxygen utilization (VO_2), oxygenation, and blood flow was collected. Also cognitive data including running memory (MEMORY) was collected. Finally, pilot performance data including operational errors (OE), command errors (CE) and total errors (TE) were recorded. **Results:** Repeated-measures analysis of variance demonstrated a significant ($p \leq 0.05$) time by condition interaction for HR, oxygenation, blood flow, and MEMORY.

A paired samples t-test demonstrated a non-significant ($p \geq 0.05$) difference for OE, CE, and TE between trials. **Conclusion:** Pilots exhibited physiological and cognitive impairments; however, pilot performance was not affected by HYP.