ABSTRACT 12

European Conference on Aerospace Medicine
2010 Athens
10th – 13th November 2010

ABSTRACT

Title: SIMULTANEITY AND RECOVERY PATTERNS, OF CO2 AND O2 PULMONARY GAS EXCHANGE MODELS, FOR EXTREME ENVIRONMENTAL PREDICTIONS; DERIVED FROM A HISTORICAL PERSPECTIVE.

Author(s) Name: Jayashri Devi Sharma MB., BS., MD (Glider Pilot)

Affiliation: Jawaharlal Nehru University New Delhi 110067

Introduction: The much vulnerability in the study of the respiratory system gas exchange and its holistic implications has arisen from the use of discrete experimental clinical, and physiologically applicable data. These are reflected in physics and mathematical reasoning of non-linear variable periodicities, temporal patterns and various magnitudes from Sneddon's times (1940 onwards) and in the early 19th Century. Subsequent kinetic and compartmentalized models use sophisticated newer clinical methodologies, hoping to include both intake and recovery conditions. Such bi-directional experimental errors of CO_2 output and O_2 extractions leading to spurious negative delta PCO_2 (b-G) are best eliminated in avian parabronchial lungs with cross-current arrangement of gas and blood flow.

Re-Breathing Methodologies

The first order CO_2 exponential in the backdrop of the Bohr, Haldane and Kelman effects were used effectively by Defares ('56), DuBois('52), and many others since then, to derive the, *'rate of change'*, in partial pressures. Inspite of the lack of pressure-content relationship some models have been able to reproduce the characteristics of several arterial blood contents. High Frequency Ventilation as found in extreme maneuvers and environments, retain values of CO_2 elimination close to the estimated metabolic CO_2 production. These exemplary chemoreflex adaptations, with both, breath holding and re-breathing, can reach a functional symmetry, as reflected in Bohr's dead space/tidal volume ($V_{D,Bohr}/V_T$)) during tidal breathing. When hyperoxic hypercapnia can occur, it should be measured best with microstream capnometer akin to a pitot of an aerospace vehicle.

Conclusions

Re-breathing studies suggest that Eupnoea can be achieved by voluntary, self-assesable-training /Yog of respiratory modifications in non-natural aerospace environments.

Ref----

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Name and address for correspondence: Dr. Jayashri Sharma, B 205 Kendriya Vihar Gurgaon, New Delhi, 122003, India

Telephone No.: +91 11 9818617813	**Fax No.:**
E-mail: jay.jayashri@gmail.com	**Date:** 31/07/2010