
Introduction. The present study was conducted to evaluate the prevalence of NIDDM among airline pilots to analyze the present status of individuals with NIDDM and impaired glucose tolerance (IGT).

Methods. A total of 1263 active crews ranging 40-60 yrs were included in the study. Medical examination every 6 month since employment and those who showed urine glucose trace and/or fasting plasma glucose (FPG) > 100 mg/dl took 75GTT (75 g of glucose in 300 ml of water) and their blood samples were analyzed. Of 3,31-91, laboratory variables were measured to determine their control status. Results. Of 1263, 43 were diagnosed as NIDDM, 192 as IGT, 10 as renal glucoseuria and the remaining 1018 were normal. Prevalence rate of NIDDM was 3.4%. A cross sectional study demonstrated that present age (52.8, 49.2 vs 46.8 yrs), FPG (107, 104 vs 92 mg/dl), HbAlc (6.1, 5.8 vs 5.5%) were higher in NIDDM and IGT than in normals, however, BMI, Tchol and uric acid levels were identical among three groups. None of them were grounded due to poor control of diabetes. Conclusion. The occurrence of NIDDM among cockpit crews was approximately 1/3 of general population despite their good health status. This factor cannot be neglected, however, intensive supervision by us seems to be effective to ameliorate their glycemic control.
INVESTIGATION OF A WINDBLAST DEFLECTOR CONCEPT FOR IMPROVED WINDBLAST PROTECTION DURING EMERGENCY ESCAPE. J. B. Specker, J. A. Plaza, and F. S. Knowlton. Armstrong Laboratory, Wright-Patterson AFB, Ohio 45433-6573.

**INTRODUCTION.** Left ventricular end-diastolic muscle volume (LVMV) and weight (LVMW) of pilots were studied with a two-dimensional echocardiography with modified Devereux formula and were compared with those of groundcrew. METHODS. Sixteen pilots (mean age 28.6, Group A) and 26 groundcrew (mean age 28.1, Group B) were studied. The subjects were classified as 'non-CF' and 'CF' according to smoking habits. RESULTS. LVMV and LVMW were significantly different between CF and non-CF subjects. CONCLUSION. The results from this study suggest that it is essential to be aware of this phenomenon when assessing relaxed G tolerances if gross errors are to be avoided. Further investigations are necessary to determine the underlying cause.
Cardiac Impedance Differential Loop in Aircrew & the Groundcrew 1.

**INTRODUCTION**
Cardiac impedance differential loop (IDL) is a plot of impedance A-V versus impedance differential dV/dt (Falke 1982). It is more informative and accurate than impedance A-V. In 269 commercial pilots, 27 cases were discovered that are not detectable nor inducible arrhythmias (AP). Nine cases had no demonstrable underlying heart pathology; one anomalous pathway (AP) in 2 cases. The ES proved that one had sick sinus syndrome, WPW in an asymptomatic pilot with no clinical or ECG evidence of a disease state. The remaining 26 received successfully drug therapy: B-blockers, Ca-antagonists, ACE inhibitors or diuretics as monotherapy or in combination. During the last five years, 5 pilots were permanently disqualified because of uncontrolled hypertension. CONCLUSION. New classes of antihypertensive drugs such as ACE inhibitors and Ca-antagonists have been effectively and safely used in civilian aviators.

**METHODS**
By law, all commercial aviators in Greece are examined every six months in HAP Ascospace Medical Centre, Athens, Greece. Intermittent cardiovascular conduction disturbances in civilian flying personnel: Wolff-Parkinson-White Syndrome. G. Canaveris*, N.S. Valjter, J. Prebyslaki. Instituto Nacional de Medicina Aeronautica y Espacial, Buenos Aires, Argentina. INTRODUCTION. Out of the several evolutive characteristics of the Wolff-Parkinson-White (WPW) syndrome, 2 are of importance as risk factors in aviation medicine: 1) the probability of antegrade atrioventricular arrhythmias development and 2) its spontaneous intermittence that may restrain exercise capability and have sedative effects. As electrophysiologic studies (ES) were performed, with Ajmalin test and/or verapamil (1.5mg/kg) for very low heart rates (HRR) transiently extrapolated for first class certification as they showed: a) cardiovascular, b) neuropsychiatric, c) bones and joint, d) ear, nose, throat, drowsiness. Then, 1.3% had eye, subdural, and respiratory disorders. Medical advice, possibly coupled with pharmacological therapy were able to consistently prevent worsening of the clinical situation. In fact, only in 3 (0.4%) pilots the disorders caused denial. It is concluded that: a) it is important to perform periodical medical examination at the medical center to obtain consistent and reliable data and, b) an individually tailored medical counselling is able to reduce denial rate.

**HYPERTENSION MANAGEMENT IN AVIATORS OF A COMMERCIAL AIRLINE. J.T. Robinson, G.V. Mantrakia, Stathagouli, Hellenic Air Force Aerospace Medical Centre, Athens, Greece.**

**INTRODUCTION.** Effective control of arterial hypertension in aviators still remains a problem. Diuretics and B-blockers may restrain exercise capability and have sedative effects. Newer classes of antihypertensive agents such as Ca-antagonists and ACE inhibitors have been proved clinically safe and effective. They present no adverse metabolic effect, they do not cause orthostatic hypotension and sedative effects. On the contrary ACE inhibitors may increase alertness. Based on these considerations, these classes of drugs have been used in recent years in the treatment of hypertension in commercial aviators in Greece. The experience gained is presented in this paper. METHODS. By law, all commercial aviators in Greece are examined every six months in HAP Ascospace Medical Centre, Athens, Greece. Intermittently hypertension is detected the aviator is grounded. After clinical and laboratory investigations, a stepped care treatment of hypertension is started. RESULTS. Out of 669 aviators we found hypertensive (BP>150/95) 17 of them succeeded adequate control of BP only by salt restriction and life style modification. The remaining 26 received successfully drug therapy: B-blockers, Ca-antagonists, ACE inhibitors or diuretics as monotherapy or in combination. During the last five years, 5 pilots were permanently disqualified because of uncontrolled hypertension. CONCLUSION. New classes of antihypertensive drugs such as ACE inhibitors and Ca-antagonists have been effectively and safely used in civilian aviators.

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Mitrail regurgitation as a cofactor in mitral valve prolapse

A. Marchlinski, H. Marcus, K. Newby
Am erica n Coil lage Services, Brook s Int e rstate, Texas 76186

Mitrail regurgitation in the setting of mitral valve prolapse identifies a subset of individuals at risk for tachyarrhythmias.

DESIGN: Case series study.

SETTING: Referral center for evaluating aviators with possible heart disease.

PATIENTS: Military aviators (n=198) known to have mitral valve prolapse evaluated and followed from December 1989 to February 1991.

MEASUREMENTS AND RESULTS: History, physical examination, echocardiography, Holter monitor, and other testing (including subsp ecifically -

Mitrail regurgitation was considered present if there was a late systolic Doppler flow reversal peak appropriately timed with maneuvers and/or color-flow/continuous wave evidence for mild-

Endocarditis was defined by at least one clinical event or positive blood culture.

RESULTS: The 198 aviators underwent 300 evaluations averaging 1.8 visits per subject. MR was noted on physical exam and/or echocardiography in 33 of these aviators. Some degree of MR (mild/mild to severe) was recorded on Doppler study in 31 aviators; 25 of these 31 aviators had associated MR as well. R. Misini and F. Fillaci. IAP, NASRS, Dept. of Aerospace Medicine and ENT Clinic, University of Rome.

CONCLUSION: In this group of MR aviators with MVP only GAC pairing was significantly more common in the subjects with MR as compared to those without MR. MR for identifying aviators with MVP who are at risk for tachyarrhythmias.

ASPECIFIC NASAL HYPERREACTIVITY IN AN AIR FORCE POPULATION AND ITS RELATIONSHIP WITH BRONCHIAL HYPERREA CTIVITY (AHB) AND NR. L. Urbania, R. Bertii. C. De Angelis, G. Petrelli, S. Farrace, P.M. Maricardili, R. Misini and F. Fillaci. IAP, NASRS, Dept. of Aerospace Medicine and ENT Clinic, University of Rome.

INTRODUCTION. Nasal function is of paramount importance for airflow. Aspecific nasal hyperreactivity (ANH) prevalence in a young AF population was investigated and compared to the prevalence of aspecific bronchial hyperreactivity (ABH) and ABH associated asthma. Aim of this study was to evaluate a group of healthy male subjects with mild head down exposure to an administered cold water and methacholine nasal provocation tests (NPTs). ANH was evaluated by computerized rhinomanometry and, only for the methacholine NPT, by measurement of nasal secretions. The methacholine bronchial provocation test (BPT) was also performed, as well as a screening test for inhalant allergy (Phadiatop). RESULTS. 25% was positive to cold water NPT, 30% to methacholine NPT and 8% to both. BPT was positive in 5% at 2/3 of doses expected was associated with ANH to either NPT. 24% was positive to Phadiatop and 91% in this group was positive to either NPT or BPT. CONCLUSION. ANH is more frequent than ABH, which is often associated to the former condition. Tachycardia seems to match very often with aspecific upper and/or lower airway hyperreactivity. Implications for selection of aircrew can follow.

Please oxygen tension in patients with peripheral occlusive arterial disease during simulated altitude exposure.

D. Schultheis-Hegemann, M. Landgraf, Department of Internal Medicine, J.W. Goethe University, 6000 Frankfurt/Main, Germany

INTRODUCTION. Tissue oxygen pressure values were determined in the tibial anterior muscles of the diseased legs of 10 patients suffering from intermittent claudication due to chronic occlusive arterial disease before and after 4 hours (17'-exposure) to an oxygen reduced gas mixture (115 mmHg pO2) simulating an altitude of 8500 feet. METHODS. Oxygen pressure values (mmHg) were determined with a laser spectrophotometer in the skin and in the muscle using early Schröder using atraumatic micro-PT-neckle electrodes. In addition transcutaneous pO2 and pCO2 (Radiometer, Copenhagen), pulse oximetry, plethysmography (Pulsiox, Horten) and electrocardiographic analysis were performed (AV, Schaffhausen, Switzerland).

RESULTS. Arterial pO2 decreased from 90.2±16.1 mm Hg to 99.9±13.4 mm Hg. Oxygen saturation decreased from 95±2.5 to 90±5.6%. Accordingly, tissue oxygen tension in the tibial muscle tissue decreased from 6.5 ± 3.6 mg Hg to 2.4 ± 0.9 mg Hg. The blood flow was significantly modified (p<0.05) in the tibial muscle. The pulse oximetry decreased from 64.5±6.3% to 53.9±7.3).

CONCLUSIONS. Exposure of patients with at rest compensated peripheral occlusive arterial disease to an oxygen reduced gas mixture results in marked decrease of tissue pO2 values without any evidence of clinical worsening, especially no rest pain. It may be discussed if rest pain in ischemic legs in due to low pO2-values or to disturbed microcirculatory perfusion.

Blood volume and orthostatic responses of men and women to a 13-day bedrest.

\*S. Forney, T. Dreicoll, L. Stenger, NASA Johnson Space Center, KRUG Life Sciences, and the Baylor College of Medicine.

INTRODUCTION. Changes in blood volume during space flight are thought to contribute to decrements in functional and postural orthostatic function. The purpose of this study was to determine whether gender affects red cell mass and plasma volume during a short exposure to simulated microgravity, and whether gender differences in orthostatic responses are altered following microgravity.

METHODS: Twenty men (31.5±5.2 yrs. STD) and eleven normally-menstruating women (33.6±6.0 yrs. STD) underwent 13 days of 6° head-down bedrest. Plasma volume (P V) and red cell mass (RCM) were measured before bedrest and on bedrest day 13. On the same days, orthostatic tolerance (OT) was determined as the maximum pressure during a presyncopal-limited lower body negative pressure test. RESULTS. Plasma volume (PV) and red cell mass (RCM) decreased (P<0.01) during bedrest in both groups, with a greater PV decrease (P<0.05) in men (6.3±0.6 ml/kg) than in women (4.1±0.6 ml/kg). Decreases in red cell mass were similar (1.7±0.2 ml/kg in men and 1.7±0.2 ml/kg in women). OT was similar for men and women before bedrest (-78.6±26 mmHg in men vs. -70±4 mmHg in women) and decreased by a similar degree (by an average of 11 mmHg in both groups) after bedrest. The changes in OT did not correlate with changes in plasma volume during bedrest (P=0.02).

CONCLUSION. Thus, although female hormones may protect PV during bedrest, they do not appear to offer an advantage in terms of loss of orthostatic function.


NASA/Johnson Space Center, Houston, TX, KRUG Life Sciences, Inc, Houston, TX and Philadelphia College of Pharmacy and Science, Philadelphia, PA

INTRODUCTION. The combined effect of postural changes, fluid shifts, and diuresis associated with the absence of the gravity vector may decrease GIM during space flight. GIM can be estimated from the mouth-to-coccyx transit time (MCTT) of orally administered lactulose (LAC); this test is used to assess changes in GIM in normal populations and in patients with chronic constipation and in patients with diabetes. Since BR mimics some of the physiological changes that occur during space flight, the effect of ten days of BR on GIM was evaluated from the MCTT of LAC.

METHODS. Subjects were 12 non-smoking males between the ages of 35 and 50. After an 8-10 h fast, 12 subjects ingested Cephalaxin (20g solution) with a lowfiber breakfast on four different days (4, 8, 20, and 20) before and on three separate days (4, 7, and 10) during BR. Breath-H2 concentrations were measured before and at 10-min intervals for 4 h after breakfast using a Quintron breathalyzer and MCTT was determined from these data. RESULTS. MCTT ranged between 50 and 100 min during ambulation and 80 and 210 min during BR with means of 79 min and 122 min, respectively. CONCLUSIONS. Mean MCTT during BR was 54% longer than during ambulation, suggesting that absorption and availability of orally administered medications and nutrients may be delayed or impaired as a result of decreased GIM during bedrest.