
INTRODUCTION. Effective experimental design, automated data analysis, and statistical modelling can maximize the information collected during cardiovascular studies with CE, TLSS and CE ensembles, and provide a detailed understanding of the subjects' cardiovascular responses. The current study used a detailed experimental design of ground level, and data analysis using multivariate analysis of variance (MANOVA) analysis of covariance (MANCOVA) was used to analyze all data collected for the PPB and RD periods. RESULTS. Comparisons of the changes in cardiovascular and performance function with garment type, exposure duration and PPB levels were possible with this experimental design. CONCLUSION. The experimental and statistical designs of both the ground level and altitude experiments allow for a more accurate comparison of the cardiovascular effects of TLSS and CE systems and their effectiveness in protection against rapid decompression.


INTRODUCTION. The ground level PPB study discussed previously showed that 3 minute exposures to 60 mmHg PPB with either TLSS and CE systems would not lead to cardiovascular collapse. This study compared the cardiopulmonary responses of subjects wearing the two systems to 60 mmHg PPB exposures. METHODS. Heart rate (HR), stroke volume (SV), cardiac output (CO), and arterial pressure (MAP) were collected during 3 minutes of exposure to 60,000 ft as described earlier. RESULTS. There were significant effects due to garment type on HR (P < 0.01), SV (P < 0.001), CO (P < 0.004) and MAP (P < 0.004), and significant interaction between duration, garment type, and PPB level for HR (P < 0.001), SV (P < 0.004), and MAP (P < 0.001) and significant interaction between duration, garment type, and PPB level for SV (P < 0.0001). There was a greater fall in stroke volume and corresponding increase in HR with the CE ensemble. CONCLUSIONS. An increased g-suit布莱德 coverage provides improved cardiovascular support during PPB at ground level.

MINIATURIZED NUCLEAR PROBE TO MEASURE CARDIAC PERFORMANCE DURING PPB. L. S. Goodman*, J. Chan, L. Yana, M. Fraser*, DCIEM, North York, Ontario M3M 3B9 and St. Michael's Hospital, Toronto, Ontario, Canada.

INTRODUCTION. Detailed measurement of cardiac function during PPB is required to determine the relationship between venous return, G-suit coverage, and pressure breathing syncope. This study examined: (a) the feasibility of using a miniaturized nuclear probe (MNP) to study cardiac function during PPB; (b) the differences in cardiovascular protection against PPB afforded by TLSS vs. Combat Edge (CE) PPB ensembles. METHODS. Six experienced subjects were labeled with Technesium99m, and exposed to 70 mmHg PPB from an air source and regulator, wearing both CE and TLSS ensembles for 3 minutes. The MNP (Cardiosint™), positioned over the left ventricle, measured: ejection fraction (EF%), left ventricular filling rate (LVFr), and relative end-diastolic volume (EDV) every 10 s. RESULTS. EF increased by 9% from control for TLSS, but decreased by 6.5% from control with CE (P < 0.05). LVFr was decreased (-0.25) with CE, but was increased (+0.85 EDVcounts/s; P < 0.05) with TLSS. EDV was reduced by -25 vs. -57 counts/10 ms for TLSS vs. CE, respectively (P < 0.05). CONCLUSION. MNP's rapidly and reliably measure cardiac function during PPB. An increase in leg bladder coverage resulted in greater protection against the PPB-induced reduction in cardiac filling.

PANEL: PSYCHOLOGICAL FACTORS IN ASTRONAUT SELECTION AND TRAINING: AN INTERNATIONAL PERSPECTIVE. P.A. SanT*, UTHS, Galveston, TX 77550.

INTRODUCTION. From 1988-1991 an international working group of psychologists and psychiatrists examined the empirical literature and research findings from isolated and demanding environments for the purpose of developing optimal psychiatric select-out and psychological select-in procedures for astronaut selection. This panel will present the most recent data on the psychological selection and training of astronauts in the U.S., Japan, and European Space Programs.


INTRODUCTION. The use of positive pressure breathing (PPB) is limited in part by the cardiovascular collapse that eventually occurs with sustained PPB. The effects of prolonged exposure to high levels of PPB were compared in subjects wearing the TLSS and CE g-suit/jerkin/mask ensembles. METHODS. Heart rate (HR), stroke volume (SV), and mean arterial pressure (MAP) were collected during 8 PPB exposure periods as described earlier. RESULTS. All 7 subjects completed ten minute exposures at all 6 levels of PPB while wearing the TLSS ensemble. Mean durations for the same subjects wearing the CE ensemble were 9.3 ± 0.7, 6.3 ± 1.0, 6.0 ± 0.9, and 6.3 ± 1.3 minutes at 60, 70, 80, and 88 mm Hg PPB. There was a significant increase in HR (P < 0.0001) and a decreased SV (P < 0.002) with PPB duration, and SV fell in SV (P < 0.0002) and an increase in MAP (P < 0.01) with increasing PPB levels. There was significant interaction between duration and garment type for HR (P < 0.001), SV (P < 0.004), and MAP (P < 0.001) and significant interaction between duration, garment type, and PPB level for SV (P < 0.0001). There was a greater fall in stroke volume and corresponding increase in HR with the CE ensemble. CONCLUSIONS. An increased g-suit coverage provides improved cardiovascular support during PPB at ground level.


INTRODUCTION. The psychiatric exclusion criteria for astronauts are based on NASA Medical Psychiatric Standards for Space Flight. Until recently, there were no standardized methods to evaluate disqualifying psychopathology in astronaut applicants. This panel will present the most recent data on the psychological selection and training of astronauts in the U.S., Japan, and Europe. This panel will present the most recent data on the psychological selection and training of astronauts in the U.S., Japan, and Europe. The use of the NASA structured psychiatric interview was effective in identifying past and present psychopathology in a group of highly motivated astronaut applicants. This was the first time a structured psychiatric interview had been used in such a setting for this purpose.
Introduction
In summer 1991 the European Space Agency (ESA) performed its second selection campaign since 1977 in order to train 10 astronaut candidates (laboratory specialists and space-flight specialists). An integral part of this selection process was the psychological evaluation according to the principles laid down in the study report "definition of Psychological Testing of Astronaut Candidates". Methods. After national preselections, 19 applicants participated in the psychological evaluation which consists of the assessment of operational aptitudes (basic cognitive and psychomotor functions) and personality traits (motivation, social capability, stress resistance). The test program included a diverse number of tests, questionnaires, individual interviews, biographical data, and semi-structured interviews. About 50 scores were available for each subject. Results. A comparison of the test scores with the original norms, a psychological selection, and discriminant function analysis of the assessment decisions will be presented and discussed. Since the psychological evaluation was finished just before the deadline of the abstract, quantitative results and conclusions cannot be given in this abstract but will be reported in the conference paper.

Results of the 1991 selection campaign. C. Fuchsberger, K.-M. Sporer, German Aerospace Research Establishment (DLR), Hamburg, Germany.

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