

Abstracts from Current Aeromedical Literature

Conkin J, et al. Information about venous gas emboli improves predictions of hypobaric decompression sickness. *Aviat Space Environ Med* 1998;69:8-16.

Information about various gas emboli (VGE) detected in the pulmonary artery such as occurrence, grade, time of first appearance and the time course in occurrence of VGE could be used to better assess the probability of decompression sickness [P(DCS)] in any hypobaric decompression. A binary correlation and survival analysis approach was used on information from 1,322 hypobaric chamber exposures to establish the relationship between DCS and VGE based on the correlation analysis. The absence of CGE is highly correlated with the absence of a DCS symptom. The correlation results suggest that the presence of VGE in the pulmonary artery is a necessary but not sufficient condition for DCS based on the survival analysis. The log logistic survival model, a one-variable model with two parameters gave a log likelihood (LL) of 757. The model was expanded to include seven additional variables, including four about VGE. The nine-parameter model gave a better LL of 481. Information about VGE plus other variables known to influence DCS is useful to better assess the P(DCS) for hypobaric decompression.

Kinght KK, et al. A comparison of stereopsis with ANVIS and F4949 night vision goggles. *Aviat Space Environ Med* 1998;69:99-103.

This study was undertaken to see if the model of NVG affects stereo acuity. Visual acuity was measured using the NVG resolution grid and stereopsis was determined using a modified Howard-Dalman tests on 13 male and 2 female aircrew. The Howard-Dalman test proved to be effective in eliminating monocular clues, thus validating its use in testing NVG stereopsis. The distribution of visual acuity across subjects and goggle models was too narrow to evaluate the effect of visual acuity on stereoacuity

in NVGs. Differences in trial means during the course of the study indicated the presence of a learning effect on the Howard-Dalman test.

Levine DS, Greenleaf JE. Immuno-suppression during space flight deconditioning. *Aviat Space Environ Med* 1998;69:172-7.

Space flight results in immuno-suppression which is likely due mainly to neuro humoral factors released in response to intermittent stress during flight. However, no major non-physiological health problems have been reported during or following space flight. Diseases resulting from immuno-suppression could occur on long duration missions and would include bacterial, fungal and viral infections in addition to increased incidence of neoplasia and autoimmunity. Pharmacokinetics and pharmacodynamics appear to be altered during space flight and as a consequence, alternative drug administration and dosing procedures will need to be developed. Moderate exercise training enhances immune function, but in-flight exercise may effect immunological parameters and immunity in ways not yet ascertained. Hyper-osmolality may enhance some immune parameters and attenuate others especially when associated with dehydration and exercise. Reducing in-flight stress may attenuate flight-induced immuno suppression, but pharmacological interventions may be essential to prevent undesirable immune responses that may occur on a long-duration mission to Mars.

Nicholson AN, Turner C. Intensive and sustained air operations: Potential use of the stimulant, Pemoline. *Aviat Space Environ Med* 1998;69:647-55.

Intensive and sustained military operations involve long periods of overnight work and the occasional use of a stimulant to maintain performance may be beneficial. A dose responses study was carried out

to investigate the effects of Pemoline, a dopaminergic agent, on overnight work to assess potential residual effects of subsequent sleep. Six healthy volunteers participated in a placebo controlled, double blind, cross-over trial involving a 12-h period of work during which subjective alertness and performance on a range of tasks were assessed at 1.5 h interval following ingestion of Pemoline (10,20,30 and 3\40 mg) and on two occasions, placebo. The work period was preceded by a 6 h sleep period with Temazepam 20 mg and followed by a 4 h recovery sleep with no medications. All sleep periods preceding the work period subjective alertness and performance on all tasks deteriorated significantly during the work period with the earliest improvements in performance on all but two tasks, compared with placebo. The onset of activity was seen 4-5 h after ingestion and alternating effects of 30 and 40 mg Pemoline persisted beyond the work period, disturbing morning recovery sleep. Doses of 10 and 20 mg Pemoline had no effect on recovery sleep. The study indicates that a 20 mg dose of Pemoline may be suitable for maintaining nocturnal performance without reviewing adverse effects on recovery sleep.

Cullen SA. Aviation suicide: A review of general aviation accident in the UK. *Aviat Space Environ Med* 1998;69:698-8

A review was undertaken of 415 general aviation accidents. Three were definite cases of suicide, and in seven cases it seemed possible that the deceased had taken his own life. Therefore, in the United Kingdom, suicide definitely accounts for 0.72% of general aviation accidents and possibly for more than 2.4%. The latter accords more closely with the findings from Germany than from United States. Previous psychiatric or domestic problems and alcohol misuse are features of these cases. Aerobatics before the final impact is another frequent finding. The investigation of fatal accidents involving 'pilot error' is incomplete without an examination of the victims' social and psychological history. An assessment of a pilots' mental well being is an essential part of aviation medical examination.

Tenney YJ, Rogers WH, Pew RW. Pilot opinions on cockpit automation issues. *Int. J of Aviat Psychol* 1998;8(2):103-120.

A survey aimed at gathering pilot opinions about high-level automation philosophy issues was administered to 132 airlines pilots of advanced automation aircraft. Pilots endorsed a human centered philosophy and saw the greatest pay off in moving from normal systems to shared performance systems, rather than to fully autonomous system. At least one autonomous system (auto-landings) was perceived as producing a high mental workload. Pilots selected simplicity and reliability as the most important features of automation, yet they would like it to support the most complex part of the job i.e. communicating, managing and planning, especially in high workload situation.

Szczuchura J, Tesclak JF, Koloos Z, Pinkowski J. Oculographic assessment of workload influence on flight performance. *Int. J of Aviat Psychol* 1998;8(2):157-176.

Presented are specific parameters of visual information intake in pilots on the job. The role of eye movements in the process of visual stimulus reception is discussed. Our own study on a MiG-23 flight simulator is presented. The method of oculographic testing of pilots performing professional assignments differing in workload is presented, and the practical implications of oculographic research are discussed

Hudson SJ. Eye injuries from laser exposure: A review. *Aviat Space Environ Med* 1998;519-24

Lasers pose a significant threat to vision in modern military operations anti-personnel lasers have been designed that can cause intentional blindness in large number of personnel. Unintended blinding can also result from other types of lasers used on the battlefield. Such as range finders and anti-maternal lasers. Lasers that are capable of producing blindness operate within specific wavelength parameters and include visible and ear improved lasers. Affected in-

dividuals complain of flash blindness, followed by transient or permanent visual loss. Laser retinal damage should be suspected in any patient with visual complaints in an operational setting. The treatment for laser retinal injuries is extremely limited and prevention is essential. Improved protective eyewear and other countermeasures to laser eye injury are necessary as long as the threat remains.

Criqui MH, Muldoon MF. The emerging role of Statins in the preventive of coronary heart disease. BMJ 1998;14:12-13.

The British guidelines conservatively recommended Statins treatment only for individuals with at least a 3% annual risk of coronary heart disease events. A threshold was selected to minimize costs and focus on patients at the highest risks. The authors feel that total cholesterol is not the best lipid parameter and instead ratio of total cholesterol to HDL as a better indicator of the Lipid profile. The change in total cholesterol-HDL ratio with treatment correlates with benefit in coronary heart disease. Statins are as effective

and popular as they are well tolerated. The authors recommend treatment of hypercholesterolemia with Statins leading to a reduction in the incidence of total and non-fatal myocardial infarctions by 30-35%.

Hunt GJF. Designing instruction for human factors training in aviation. Aldershot, Anebury Aviation 1997.

The central issue of this book is not whether to teach human factors, but how to teach it. The objective of the project was to develop an instructional resource for people who had responsibilities for designing teaching or evaluating human factor issues in aviation training and educational programs. This book brings together a range of insights and experiences structured to follow the instructional process from the initial design principles and underlying theories through the use of technology for teaching, the specific needs of groups such as air traffic controllers and air accident investigators to assessment procedures.