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Abstract from the Literature

by
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Bovard RS. Injuries to avian researchers at Palmer Station, Antarctica from penguins, giant petrels and skuas. Wild Environ Med 2000, 11, 94-98.

This paper describes 5 cases of injury to seabird researchers between 1996 and 1999 at Palmer Station, Antarctica. The injuries were inflicted by three seabird species: the Adelie penguin (*Pygoscelis adeliae*); the southern giant petrel (*Macronectes giganteus*) and the brown skua (*Catharacta lonnbergi*). All injured parties were biologic researchers with previous field experience working under National Science Foundation research grants; all sought medical evaluation and treatment voluntarily. The nature and frequency of such injuries seems not to have been greatly reported in the medical literature. Although these cases were largely soft tissue injuries that healed without serious complications, the possibility of exotic infections is considered. We have dubbed this constellation of injuries AVES (Antarctic Vogel [German for bird] Encounter Syndrome).

Comment: Wilderness and Environmental Medicine is always good for obscure and exotic papers. Unfortunately, this paper seems to have failed in the editing process: despite the authors' attempt at immortality through the tenuous acronym in the abstract. 'AVES' does not rate a mention in the paper itself!

Basnyat B, et al. Disoriented and ataxic pilgrims: an epidemiological study of acute mountain sickness and high-altitude cerebral edema at a sacred lake at 4300m in the Nepal Himalayas. Wild Environ Med 2000, 11, 89-93.

Objective: To determine the incidence of high-altitude cerebral edema (HACE), acute mountain sickness (AMS) and high-altitude pulmonary edema (HAPE) in pilgrims. Although it is well known that western trekkers suffer from AMS in the Himalayas, not much is documented about the incidence of AMS in the local population of Nepal that [sic] go to high altitude.

Methods: The design was a randomised study at a sacred high-altitude lake at 4300m at Gosainhunda in the Nepal Himalayas. There was a control study at 1300m at Pashupatinth in Kathmandu, Nepal. The subjects were pilgrims of different ethnic Nepali backgrounds. The Lake Louise consensus for AMS, HACE and HAPE was used, and oxygen saturation with a pulse oximeter was performed on HACE subjects.

Results: Out of 5000 pilgrims, 228 were randomly chosen. 68% had AMS, 31% had HACE and 5% had HAPE. The mean oxygen saturation of HACE subjects at that altitude was 77%, 87% being normal for 4300m altitude. 73% of the study population were men, yet women had a significantly higher rate of AMS (odds ratio 4.34, 95%CI 1.83-10.68). HACE (odds ration 3.15 CI 1.62- 6.12). and HAPE (odds ration 5.2, CI 1.24- 24.73).

Conclusions. Such a high incidence of HACE in an epidemiological study using the Lake Louise criteria has, to our knowledge, not been reported before. High altitude pilgrims, especially women pilgrims in this study, seem to be a very susceptible group. Preventive measures in these pilgrims need to be adopted to avoid AMS, specifically life-threatening HAPE and HACE.

Comment: Here is a well constructed and original study that sets you thinking. Most of these pilgrims come from a base altitude of 2000m and ascended to 4300m in two days. The recommendation of daily ascent of no more than 300m above 2800m should apply to anyone, including Nepalese. The confounder is that the pilgrims may be dehydrated: the custom is to fast throughout the pilgrimage, and a measure of dehydration was not made by the researchers. This study showed a much higher odds ratio for women than other studies. The paper speculates that the women may have taken the fast more seriously than the men, not even drinking water. There is no basis for this idea, however. The dehydration will not result in the decreased oxygen saturation observed, nor will it be improved by use of dexamethasone: all HACE sufferers were given dexamethasone and did recover.

Ercoline WR, et al. Post-Roll effects on Attitude Perception: 'The Gillingham Delusion'. Aviat Space Environ Med 2000; 71: 489-495.

Background: Several aircraft each year are lost because of an unexplained collision with the ground. The attitude of most of these aircraft prior to impact was nose-low and with excessive bank; i.e. greater than 90°. Prior to these accidents, each aircraft was noted as either changing heading or making an abrupt roll.

Hypotheses: Could there be some underlying tendency for the pilot to make unnoticed stick inputs after completing a roll from one bank angle to another? **Methods:** Since ground-based flight simulators cannot create the true sensation of rolling and aircraft from one side to the other, the instrumented CALSPAN NT-33 aircraft was used for this study. Six pilots were given a series of three roll rates and two head positions while the aircraft changed bank from 45° of bank in one direction to 45° of bank in the opposite direction. The subjects view of the external visual scene was restricted with a blue amber vision restricting transparency combination. All attitude-indicating instruments were blanked, requiring the subjects to make stick inputs based on their vestibular (somatosensory) feedback.

Results: Subjects experienced a consistent tendency to increase bank angle after given control of the aircraft immediately following the roll manoeuvre, while thinking they were maintaining a constant bank angle. In some cases, the pilots rolled the aircraft completely inverted.

Conclusion: When pilots rely on their perception of bank, following a roll, they will inadvertently increase their bank in the direction of the previous roll.

Comment. A useful addition to the possible disorientation / illusions that can lead to Controlled Flight into Terrain. I suspect that there are RAAF accidents that have been contributed to by such an effect in recent times.

Korenji-Both A.L. et al. The role of the Sand in Chemical Warfare Agent Exposure among Persian Gulf War Veterans: AI Eskan Disease and "Dirty Dust". Mil Med 2000; 165(5):321-336.

The purpose of this paper is to inquire into the relationship between AI Eskan disease and the probable exposure to chemical warfare agents by Persian Gulf War veterans. AI Eskan disease, first reported in 1991, compromises the body's immunological defence and is a result of the pathological properties of extremely fine, dusty sand located in the central and eastern region of the Arabian Peninsula. The disease manifests with localized expression of the multisystem disorder. Signs and symptoms of AI Eskan disease have been termed by the news media "Persian Gulf Syndrome". The dust becomes a warfare agent when toxic chemicals are microimpregnated into inert particles. The "dirty dust" concept, that toxicity of an agent could be enhanced by absorption into inactive particles, dates from World War I. A growing body of evidence shows that coalition forces have encountered Iraqi chemical warfare in the theater of operation/Persian Gulf War to a much greater extent than early US Department of Defense information had indicated. Veterans of that war were exposed to chemical warfare agents in the form of direct (deliberate) attacks by chemical weapons, such as missiles and mines, and indirect (accidental) contamination from demolished munition production plants and storage areas, or otherwise. We conclude that the microimpregnated sand particles in the theatre of operations/ Persian Gulf War depleted the immune system and simultaneously acted as vehicles for low-intensity exposure to

chemical warfare agents and had a modifying-intensifying effect on the toxicity of exposed individuals. We recommend recognition of a new term, "dirty sand", as a subcategory of dirty dust/ dirty chemical warfare agents. Our ongoing research efforts to investigate the health impact of chemical warfare exposure among Persian Gulf War veterans suggests that Al Eskan disease is a plausible and preeminent explanation for the preponderance of Persian Gulf War illnesses.

Comment: *A lengthy and ultimately unconvincing article. The Journal Military Medicine it seems is deliberately seeking controversy, as this concept can best be described as fringe. There is nowhere evidence that there was actually CW agents in the fine sand, that agents remain for long periods under such conditions, that such chemicals could be biologically active, that there were methods to distribute such agents in such a way to ensure there were no significant collections and that they could be distributed widely enough to cause illness in such disparate groups, and that there was no-one exposed to sufficiently high amounts to produce acute symptoms. There appears to be no correlation to exposure to sand during the Gulf War and to other US or allied exposures before and after the Gulf War, if it were fine sand causing multisystem disease, then it should be present in many others. Drawing a very long bow, the authors suggest Al Eskan disease was the cause of the illness in Lawrence of Arabia. The picture of Gulf War Syndrome simply does not fit the scenario being described in this article. I find it very unsatisfactory that such a very intellectually suspect paper finds its way into the premier English language Military Medicine journal. 'Al Eskan disease is a plausible and preeminent explanation for the preponderance of Persian Gulf War illnesses' say the authors: NOT!*

Vanderburgh PM, Flanagan S. The Backpack Run Test: A Model for a Fair and Occupationally Relevant Military Fitness Test. Mil Med 2000; 165(5): 418- 421.

Our purpose in this investigation was to develop and validate a theoretical model for a backpack run test based on how fast one can run 2 miles while wearing a backpack. Using actual unloaded (no backpack) 2-mile-run test data from 59 males service academy cadets, we calculated the average oxygen cost during the run, the equivalent cost if wearing additional weight, and the corresponding estimated run time with the backpack. The correlations between body weight and loaded (backpack weight = 30 kg) run times ($r = 0.55$ [$p < 0.05$] and $r = 0.12$ [$p < 0.05$], respectively) demonstrate that the bias against heavier runners is eliminated with the backpack run. Given that the backpack run test requires only standard-issue equipment, demonstrates clear occupational and health-related fitness relevance, predicts no apparent body-size bias, and measures work-and health-related components of fitness, we recommend that the military services consider the present data when developing or modifying tests of physical fitness.

Comment. *Maybe I have picked flawed papers deliberately so I can appear tough and incisive. Anyway, this paper fails to consider the affect of injuries inflicted in personnel training for and conducting such a test, and the actual relevance to what personnel will be doing in the field. How many times will people have to run 2 miles with a 30kg pack (funny about how the imperial and metric measurements are interwoven) while deployed? Save us from such stupidity.*

Peterson AL, Helton J. Smoking Cessation and Weight Gain in the Military. Mil Med 2000; 165(70): 536-537.

Many studies of civilian populations have found a significant relationship between smoking and weight gain. However, the effect of voluntary smoking cessation on weight for military personnel has not been studied. The present study evaluated 70 active duty military members (55 males and 15 females) who quit smoking after participating in an 8-week smoking cessation program. The results indicated that 88% of the participants gained weight and that the average weight gain was 6.6 lb. (9 males 5.5 lb., females 9.8 lb.). These results are particularly noteworthy because weight gain in military members may result in administrative actions for individuals exceeding weight standards. The authors recommend that military officials consider adopting a one-time temporary weight waiver for active-duty military members who successfully quit smoking to help prevent any negative administrative consequences of post-cessation weight gain.

Comment: *So further proof that military members are only human after all. Waivers are dangerous things and can often turn into semi-permanent and permanent features for an individual. Uncomplicated overweight in and of itself is an administrative issue, not a medical one, while the reverse is true of smoking. As is noted in the study, weight gain in civilians is maintained over time. The overhang of administrative action may result in the reduction of weight gain or a return to pre-cessation weight in military personnel.*

Palinkas LA, et al. Predictors of Behaviour and Performance in Extreme Environments: the Antarctic Space Analogue Program. Aviat Space Environ Med 2000; 71: 619-625.

Background: To determine which, if any, characteristics should be incorporated into a select-in approach to screening personnel for long-duration spaceflight, we examined the influence of crewmember social/demographic characteristics, personality traits, interpersonal needs, and characteristics of station physical environments on performance measures in 657 American men who spent an austral winter in Antarctica between 1963 and 1974.

Methods: During screening, subjects completed a Personal History Questionnaire which obtained information on social and demographic characteristics, the Deep Freeze opinion Survey which assessed 5 different personality traits, and the Fundamental Interpersonal relations Orientation-Behaviour (FIRO-B) Scale which measured 6 dimensions of interpersonal needs. Station environment included measures of crew size and severity of the physical environment. Performance was assessed on the basis of combined peer supervisor evaluations of overall performance, peer nominations of fellow crewmembers who made ideal winter-over candidates, and self-reported depressive symptoms

Results: Social/ demographic characteristics, personality traits, interpersonal needs, and characteristics of station environment collectively accounted for 9-17% of the variance in performance measures. The following characteristics were significant independent predictors of more than one performance measure: military service, low levels of neuroticism, extraversion and conscientiousness, and a low desire for affection from others.

Conclusions: These results represent an important first step in the development of select-in criteria for personnel on long-duration missions in space and other extreme environments. These criteria must take into consideration the characteristics of the environment and the limitations they place on meeting needs for interpersonal relations and task performance, as well as the characteristics of the individuals and groups who live and work in these environments.

Comment: *Archived material, over 25 years old, was used in this study. There may be so much more raw data out there just waiting to be analysed. This data shows that the characteristics associated with performance are of themselves of minor importance. A total of about 10% of the variance. Hardly enough to justify selecting preferentially those with such characteristics. However, the researcher's state 'combined with evidence of conservation of resources and salutogenic models of behaviour, these results suggest that personality characteristics and interpersonal needs are context-specific predictors of behaviour and performance in extreme environments.*

Watson DB, et al. Effect of Normobaric Hypoxia on Auditory Sensitivity. Aviat Space Environ Med 2000; 71: 791-797.

Previous psychophysical studies of hypoxia's effects on auditory sensitivity have provided mixed results but the weight of evidence supports the conclusion that sensitivity is unaffected by hypoxia. This conclusion is discrepant with that drawn from physiological studies in which hypoxia has been found to affect auditory-evoked response (AER) latency. One possible explanation of this discrepancy concerns the relatively low maximum frequency (8 kHz) for which hypoxia's effects were assessed in the psychophysiological studies. We have extended the range of frequencies up to 16 kHz. Thresholds for

1-, 8-, 10-, 12-, 14- and 16-kHz tones were measured at levels of hypoxia equivalent to altitudes of 0, 1200, 2400 and 3700 m. Our results indicate that sensitivity for frequencies up to 16 kHz is unaffected by hypoxia. We suggest that AER latency does not provide a valid measure of auditory sensitivity.

Comment: A definitive study from the RAAF Institute of Aviation Medicine which demonstrates the lack of an effect on auditory sensitivity by hypoxia up to 3700 m. However, it does not attempt to speculate as to why there is no effect.