

MAY 1998

Baroreceptor adaptation (302 Health Services Flight, RAAF Base Williamstown and University of Newcastle, NSW, Australia): "The arterial baroreflex acts to maintain arterial pressure in the face of an orthostatic challenge. The high +G_z loads experienced by fighter pilots represent an extreme form of orthostatic challenge. G-induced loss of consciousness (G-LOC) represents a failure of the baroreflex system to maintain the appropriate level of cerebral perfusion. The anecdotal experience of fighter pilots is that their cardiovascular systems adapt to frequent exposure to high +G_z levels... The purpose of this study was to demonstrate that the baroreflex-mediated cardiovascular response of a group of 8 fighter pilots to a mild accelerative stimulus differs from that of a group of 12 non-pilots... In response to tilt, the non-pilots showed little change in systolic and mean arterial pressures, diastolic pressure increased slightly and pulse pressure decreased significantly. In the pilot group, however, significant increases were observed in systolic, diastolic and mean arterial pressures ($p < 0.05$), whereas pulse pressure did not change. Between groups there were significant differences observed in terms of arterial pressures ($p < 0.05$), but not heart rate... The baroreflex of a fighter pilot is capable of adapting to +G_z, becoming a more sensitive and effective BP control system as a result. This adaptation affords the pilot greater protection against G-LOC."³

Laser threat (NAS Whidbey Island, WA): "Lasers pose a significant threat to vision in modern military operations. Anti-personnel lasers have been designed that can cause intentional blindness in large numbers of personnel. Although the use of blinding laser weapons during combat has been prohibited by international legislation, research and development of these weapons have not been prohibited, and significant controversy remains. Unintentional blinding can also result from other types of lasers used on the battlefield, such as range-finders and anti-material lasers. Lasers that are capable of producing blindness operate within specific wavelength parameters and include visible and near infrared lasers. Patients who suffer from laser eye injuries usually 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 [sic] and other countermeasures to laser eye injury are necessary as long as the threat remains."²

MAY 1973

Needs of quitters vs. completers (Naval Aerospace Medical Institute, Pensacola, FL): "The purpose of the present study was to determine whether (1) student pilots who voluntarily drop from the program (DORs) [Drop on Requests] and those who successfully complete training enter the flight program with different 'needs,' and (2) whether DORs and 'completers' differ in their evaluation of the program's ability to satisfy their needs. The needs that were explored were those of the Maslow hierarchy, including physiological, safety, and security, social, self-esteem and self-actualization needs. Eighty-seven aviation officer candidates

were given a questionnaire designed to measure optimism, relevance, and importance in terms of the five needs described above. They were given the test initially on the third day after entering the program (Time I), and then again after 9 weeks of training (Time II). The results indicate that DORs differ from completers in their evaluation of how well their needs are satisfied. Within the first 9 weeks of training, DORs indicated that meeting their needs was more 'important,' though they were less 'satisfied' and 'optimistic' than completers, particularly with regard to the self-actualization need."¹

MAY 1948

Spatial disorientation (U. of Hawaii and School of Aviation Medicine, Naval Air Training Bases, Pensacola, FL): "Among the problems of aviation of particular interest to the psychologist is disorientation, or disturbance in the pilot's relation to his environment..."

"It is widespread among aviators; although all aviators are acquainted with it to some degree, it appears to vary in severity and frequency, some pilots experiencing it seldom and mildly, others often and acutely. At present, pilots seem to ascribe it to whatever cause fits their own experience; the indication is that any factor interfering with adequate adjustment to the environment may bring it about. Although aviator's vertigo may occur under any condition of flying, it is most likely to occur under any condition of danger, namely, when the aviator is on instruments or going from contact to instrument conditions, or, if the pilot is flying contact, when flying conditions are unfavorable; similarly, it is most likely to occur at night, becoming more frequent as visibility gets worse; in formation flight it is predominantly a feature of the wing position; and it is more likely on solo flights than on dual flights or solo day flights. When classified according to type of incident reported, it was found that visual and nonvisual illusions and conflicts between sensory cues constitute the majority of precipitating factors; dissociation and general emotional upset are significant but less frequent factors. Incidents involving fascination are less frequent than those involving vertigo. In general, the case material emphasizes the prominence of psychological components in aviator's vertigo."⁴

REFERENCES

1. Bucky SF, Burd J. Need satisfaction in the identification of the DOR. *Aerosp Med.* 1973; 44(5):513-515.
2. Hudson SJ. Eye injuries from laser exposure: a review. *Aviat Space Environ Med.* 1998; 69(5):519-524.
3. Newman DG, White SW, Callister R. Evidence of baroreflex adaptation to repetitive +Gz in fighter pilots. *Aviat Space Environ Med.* 1998; 69(5):446-451.
4. Vinacke WE. Aviator's vertigo. *J Aviat Med.* 1948; 19(3):158-170.

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