
INTRODUCTION. The Vestibulo-Ocular-Reflex Performance Evaluation Test (VORPET), developed at the Naval Aerospace Medical Research Laboratory, gives a measure of left- and right-directed posture-threshold time. This test can be used to assess the type of head/eye coordination relevant to the aviator who routinely makes large shifts in gaze while scanning cockpit instruments and the outside environment. Automation of the VORPET requires the use of a voice-recognition system to collect and score the subject's voice responses. We compared the accuracy of the Votan voice-recognition system to that of the present method that uses a test administrator to listen and record subject's responses when administering the VORPET. METHODS. Thirty-six subjects were administered the VORPET under three different conditions: (a) direct viewing of the stimulus digits presented on the CRT, involving no head movement, (b) VORPET administration using a test operator for subject's voice recognition and manual data entry, and (c) VORPET administration using the automatic voice-recognition system for subject's voice acquisition and recognition. Two, three, and four digits were used as visual stimuli for each method. RESULTS. Analysis of variance of test results indicates significant differences between the thresholds obtained when methods (b) and (c) were used to administer the VORPET. CONCLUSIONS. The Votan automated voice-recognition system cannot be used to automate the VORPET. Present speed and accuracy of the automated voice-recognition systems still need additional technological advancement or improvement in order to replace the present "human-based voice-recognition system."

PEER REVIEWS OF PUBLISHED STUDIES.

A CHINESE TENDON REFLEX (ATR) IN RESPONSE TO SHORT EXPOSURES OF MICROGRAVITY AND HYPERGRAVITY. M. Fujita and M. Iwai. Space Biomedical Research Institute, Biomedical Operations and Research Branch, NASA Johnson Space Center, Houston, Texas 77058.

INTRODUCTION: Previous studies indicate that latency and amplitude of the ATR are altered after exposure to microgravity for 28 days. The objective of this study was to quantitatively measure the latency of the ATR during brief (2-s) exposure to microgravity and hypergravity (1.8 g) in KC-135 parabolic flight.

METHODS. The ATR was elicited in ten men during parabolic flight, with the ankle in neutral, plantarflexed, and dorsiflexed conditions. During flight, the ATR was elicited during the 0-g and 1.8-g phases. Postflight testing was performed back to the airfield. Latencies to onset of the ATR were calculated and analyzed of variance were performed to determine the effect of gravity and ankle position on latency. RESULTS. The mean latencies for 0-g, 1.8-g, and postflight with the ankle in the neutral position were 32.7 +/- .5 ms, and 33.1 +/- .7 ms, respectively, which were not significantly different. There was a trend towards prolongation of latencies postflight. The mean latency for those who were motion sick was 32.1 +/-1 ms compared to 34.0 +/-3 ms for those who were not sick.

CONCLUSIONS. These studies indicate that neither the level of gravity nor ankle position significantly affected the latency of the ATR.

PREDICTION OF SPACE SICKNESS IN ASTRONAUTS FROM PREFLIGHT FLUID, ELECTROLYTE, AND CARDIOVASCULAR VARIABLES AND WEIGHTLESS ENVIRONMENTAL TRAINING FACILITY (WETF) TRAINING. R. Simonsen*, E. Mosely, and J. Charles*. Space Biomedical Research Institute, NASA Johnson Space Center, Houston, Texas 77058.

Nine preflight variables related to fluid, electrolyte, and cardiovascular status from 64 first-time Shuttle crewmembers were differentially weighted by discriminant analysis to predict the incidence and severity of each crewmember's space sickness as rated by NASA flight surgeons. The nine variables are serum uric acid, red cell count, environmental temperature at the launch site, serum phosphates, uric acid, phosphates, serum thyroxine, sitting systolic blood pressure, calculated blood volume, and serum potassium. These variables enable the prediction of space sickness incidence (NONE or SICK) with 80 percent significance and severity (NONE, MILD, MODERATE, or SEVERE) with 59 percent success by one method of cross-validation and 67 percent by another method. Addition of a tenth variable, hours spent in the Weightless Environment Training Facility (WETF), did not improve the prediction of space sickness incidence but did improve the prediction of space sickness severity to a significant level by first method of cross-validation of the original sample and to 71 percent by the second method. Results to date suggest the presence of predisposing physiologic factors to space sickness that implicate the cardiovascular status of the astronaut. The data also suggest that prior exposure to fluid shift during WETF training may induce a circulatory readaptation to fluid shifts in weightlessness that results in a reduction of space sickness severity.