Vestibular meeting abstract 2: 260 words

Effect of Passive Horizontal Rotations and Vertical Oscillations on Dynamic Visual Acuity

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Astronauts experience sensorimotor disturbances after long duration space flight. These crewmembers may need to egress the vehicle within a few minutes for safety and operational reasons in various sea state conditions following a water landing. Exposure to even low frequency motions induced by sea conditions surrounding a vessel can cause significant fine and gross motor control problems affecting critical functions. The objective of this study was to document human motor and visual performance during simulated wave motion in the 0.1 to 2.0 Hz range. We examined in 12 healthy subjects the changes in accuracy when performing a seated visual target acquisition task in which the location of target was offset vertically during horizontal full body rotation at an oscillating frequency of 0.8 Hz (peak velocity of 160 deg/s). The main finding was that the accuracy of performance degraded in 7 of 12 subjects when acquiring vertical targets at perturbing frequencies of 0.8 Hz in the horizontal plane by one step size. We also examined in a separate study on 12 healthy subjects seated dynamic visual acuity (DVA) task performance during vertical full body oscillations at perturbing frequencies of 2 Hz (peak to peak motion of 5 cm). The main finding was that DVA was significantly reduced when acquiring targets at perturbing oscillations at frequencies of 2 Hz in the vertical plane by approximately 1 chart line. Thus low frequencies of perturbations in the horizontal and vertical planes can cause decrement in visual performance.

This study was supported in part by a grant from the NSBRI through NASA NCC 9-58 (SA02001)