

Walk on Floor Eyes Closed Test as a Measure of Postflight Ataxia

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INTRODUCTION

Astronauts returning from space flight universally exhibit impaired posture and locomotion. Measurement of this impairment is an evolving process. The walk on the floor line test with the eyes closed (WOFEC) provides a unique procedure for quantifying postflight ataxia. Data from a modified WOFEC were obtained as part of an ongoing NASA interdisciplinary pre- and postflight study (Functional Task Test, FTT) designed to evaluate astronaut postflight functional performance.

METHODS

Seven astronauts (5 short duration with flights of 12-16 days; 2 long duration crewmembers with flights of 6 months) were tested twice before flight, on landing day (short duration only), and 1, 6, and 30 days after flight. The WOFEC consisted of walking for 10 steps (repeated twice) with the feet heel to toe in tandem, arms folded across the chest and the eyes closed. The performance metric (scored by three examiners from video) was the percentage of correct steps completed over the three trials. A step was not counted as correct if the crewmember sidestepped, opened their eyes, or paused for more than three seconds between steps.

RESULTS/ CONCLUSIONS

There was a significant decrease in percentage of correct steps on landing day (short duration crew) and on first day following landing (long duration) with partial recovery the following day, and full recovery beginning on day sixth after flight. Both short and long duration fliers appeared to be unaware of foot position relative to their bodies or the floor. Postflight, deviation from a straight path was common, and the test for two crewmembers elicited motion sickness symptoms. These data clearly demonstrate the sensorimotor challenges facing crewmembers after returning from spaceflight. The WOFEC test has value providing the investigator or crew surgeon with a simple method to quantify vestibular ataxia, as well as providing instant feedback of postural ataxia without the use of complex test equipment.