

SPACE LIFE SCIENCES SYMPOSIUM (A1)  
Human Physiology in Space (2)

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SHORT DURATION RESISTIVE EXERCISE SUSTAINS NEUROMUSCULAR FUNCTION AFTER  
BED REST

**Abstract**

**Purpose:** To assess the effectiveness of a short duration, high-load resistive exercise program performed three days a week on preventing deterioration in neuromuscular function after prolonged bedrest.

**Methods:** Twenty-four male subjects as part of the 2nd Berlin Bed Rest Study (BBR2-2) performed high-load resistive exercise (RE; n=8), high-load resistive exercise with whole-body vibration (RVE; n=9) or no exercise (CTR, n=9) during 60-days head-down tilt bed rest. Peak countermovement jump power and height, sit-to-stand tests, sprint time over 15m and 30m and leg-press one repetitions maximum were measured before and after bed rest. Values are reported as mean(SD) percentage change versus pre-bed-rest.

**Results:** The exercise interventions ameliorated losses of peak jumping power ( $p < 0.001$ ; CTR:-27(13)%, RE:-11(9)%, RVE:-7(12)%) and height ( $p < 0.001$ ; CTR:-37(16)%, RE:-17(13)%, RVE:-13(8)%), deterioration of performance in sit-to-stand tests from 45cm ( $p = 0.034$ ; CTR:+27(30)%, RE:+1(11)%, RVE:+4(6)%) and 30cm ( $p < 0.001$ ; CTR:+36(20)%, RE:+9(14)%, RVE:+4(13)%) sitting positions, increases of 15m sprint time ( $p = 0.037$ ; CTR:+50(24)%, RE:+8(7)%, RVE:+18(21)%), increases of 30m sprint time ( $p = 0.005$ ; CTR: +37(13)%, RE: +6(7)%, RVE: +15(13)%) and losses of one-repetition maximum leg-press ( $p < 0.001$ ; CTR: -12(6)%, RE:+2(6)%, RVE: +11(8)%).

**Conclusion:** The short duration (6 minutes time under tension per training session) exercise countermeasure program performed three times a week was capable of reducing the impact of prolonged bed rest on a number of neuromuscular function measures.