

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

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CARDIOVASCULAR ADAPTATIONS DURING SUSTAINED ACCELERATION IN A SHORT-ARM  
HUMAN CENTRIFUGE INCREASES IN HEART RATE, AND TOTAL PERIPHERAL RESISTANCE  
ARE THE MAIN COUNTER-MEASURES DURING CONSECUTIVE +G-FORCE EXPOSURE

**Abstract**

**Introduction** The purpose of this investigation was to examine the endogenous physiological cardiovascular counter measures active during 2 rounds of alternating +Gz s in a short arm human centrifuge (SAHC). We hypothesized that the hemodynamic mechanisms at play during initial +Gz, such as increases in heart rate (HR) and total peripheral resistance (TPR), would react to a second +Gz phase profile in the same manner. **Methods** 20 subjects, were exposed to two rounds of +Gz in a SAHC. The G force profile followed a plan of nine phases of varying +Gz exposure. Each subject began with a baseline +0Gz exposure, followed by step by step +Gz phase profile of +1Gz-+2Gz-+1Gz. The second round was identical to the first round of +Gz. Each phase lasted for four minutes. During this experiment, non-invasive cardio-vascular parameters were recorded. The parameters examined were cardiac output (CO), heart rate (HR), mean arterial pressure (MAP), stroke volume (SV), systolic/diastolic blood pressure (sys/dia BP), and total peripheral resistance (TPR). **Results** From the 20 subjects, 14 successfully completed the entire +Gz profile. In the first round of +Gz, amongst these 14 subjects, HR increased to 34 **Discussion** The results from this study showed that the physiological counter-measures active during a first exposure to +Gz are just as active in a subsequent second exposure to +Gz.