**DELIVERY OF CARDIOPULMONARY RESUSCITATION IN THE MICROGRAVITY ENVIRONMENT.**

**M. R. Barratt* and R. D. Billica*.**

**INTRODUCTION.** The microgravity environment presents several challenges for delivering effective cardiopulmonary resuscitation (CPR). Chest compressions must be driven by muscular force rather than by the weight of the rescuer's upper torso. Airway stabilization is influenced by the neutral body posture since rescuers will consist of crewmembers of varying sizes and degrees of physical deconditioning from spaceflight. Several ACLS CPR devices designed to accommodate these factors were tested in the one g environment, in parabolic flight, and on a recent shuttle flight. METHODS. Utilizing study participants of varying sizes, different techniques of CPR delivery were evaluated and a recording CPR manikin to assess adequacy of compressive force and frequency. Results showed that conditions of parabolic flight, methods included conventional positioning of rescuer and victim, free-floating "aircraft." The spacecraft were straddling the patient with active and passive restraints, and utilizing a mechanical cardiac compression assist device (CCAD). Multiple restraint systems and ventilation methods were also assessed. RESULTS. Determining the most effective technique of CPR was adequate but rapidly fatiguing. The CCAD was able to provide adequate compressive force, but positioning was problematic. CONCLUSIONS. Delivery of effective CPR in microgravity will be dependent on adequate restraint, equipment, and rescuer size and preference. Free-floating CPR may be employed as a stop-gap method until patient restraint is available. Development of an adequate CCAD would be desirable to compensate for the effects of deconditioning.

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**ADVANCED CARDIAC LIFE SUPPORT (ACLS) UTILIZING MAN-TENDED CAPABILITY (MTC) HARDWARE ONBOARD SPACE STATION FREEDOM.**

**M. Smith, M. Barratt, C. Lloyd, R. Billica, and S. Johnson.**

**INTRODUCTION.** Because the time and energy involved returning a patient from space to a definitive medical care facility, the capability for Advanced Cardiac Life Support (ACLS) exists onboard Space Station Freedom. In order to evaluate the effectiveness of terrestrial ACLS equipment, a medical team conducted simulations during parabolic flight onboard the KC-135 aircraft. The hardware was evaluated for use during the MTC phase of the space station was utilized to increase the fidelity of the microenvironment. Based on initial KC-135 testing of CPR and ACLS, changes were made to the ventricular fibrillation algorithm. ACLS in microgravity is hindered by the environment, but should be adequate. Factors specific to microgravity were identified for inclusion in the protocol including immediate restraint of the patient and early intubation to assure airway. External cardiac compressions of adequate force and frequency were administered using various methods. The most significant limiting factors appear to be crew training, crew size, and limited supplies. CONCLUSIONS. Although ACLS exists onboard the space station, further evaluations are necessary to further refine the protocol. Proper patient and medical officer restraint is crucial prior to advanced procedures. Also, emphasis should be placed on early intubation for airway management and drug administration. Preliminary results and further testing will be utilized in the design of medical hardware, determination of crew training, and medical operations for space station and beyond.