

An Investigation into the effects of Resistance Training and Aerobic Training for use in the Micro-gravity Environment of Space.

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Abstract

Missions to other celestial bodies place new demands on the human body and its physiological systems. To-date no clear designs have been determined concerning definitive exercise regimes to counteract the deleterious effects of micro-gravity in the Space environment.

The aims of the research that we present were to investigate the use of two distinct training protocols to increase physical performance with a view to counteracting the effects of micro-gravity. These were designed according to two types of training, namely aerobic and isotonic resistance training.

As a ground based study, the investigations targeted hypertrophy and increase in maximal force of contraction of lower limb muscles. The protocols were used over a six week period with individuals allocated to two groups. From our study we concluded that improvements occurred in maximal power output of the lower limbs ($p < 0.05$) and VO_2 max ($p < 0.05$) for both groups. We demonstrate that exercising at specific intensities causes muscles to hypertrophy and increase in muscle power output, and that isotonic muscle actions could play an important role in maintaining muscle performance in a micro-gravity environment. Stremel et al (1976) studied the effects of dynamic and static leg exercises during a period of bed rest. The study demonstrated that a resistance training programme can have considerable effect on VO_2 , as well as a maximal voluntary muscle contraction. Decreases in VO_2 were observed in both test groups but with lesser decreases in the dynamic resistance trained group. This study shows a greater increase in the resistance trained group which is supplemented by an aerobic training session.

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