

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

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EFFECTIVENESS OF AN IMPROVED ARTIFICIAL GRAVITY WITH ERGOMETRIC EXERCISE
DEVICE AS A COUNTERMEASURE FOR SPACEFLIGHT DECONDITIONING**Abstract**

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In recent years, Japanese astronaut has a long stay in the International Space Station (ISS). Long term exposure to microgravity by space flight increases the risk of spaceflight deconditioning including cardiovascular, musculoskeletal, bone and metabolism, neurovegetative disorder. The cause of the spaceflight deconditioning has not been clarified, however, it appears to be mainly caused by cephalad fluid shift and gravitational unloading of the lower limb. We proposed the manufacture of the facility of artificial gravity using short radius centrifuge with ergometric exercise as a countermeasure for spaceflight deconditioning. Our centrifuge device consists of a rotating rod with a radius of 2 m, and a maximum rotating capacity of 302/s. We previously reported that daily artificial gravity of 1.4 G with ergometric exercise of 60 W is useful as a countermeasure for spaceflight deconditioning induced by 20 days head-down bedrest. However, the radius of our centrifuge with ergometer device is limited by its planned location in the ISS to be 1.4 m. Therefore, we have improved the size of the equipment available to the ISS. The aim of our study is to validate the improved artificial gravity with ergometric exercise as a universal countermeasure to prevent the spaceflight deconditioning.