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HORIZONTAL RUNNING BOUTS INSIDE A CIRCULAR WALL ON THE MOON AS A COUNTERMEASURE TO PROLONGED LOW GRAVITY DECONDITIONING OF BONE, MUSCLE AND CARDIO-VASCULAR FITNESS. IMPLICATIONS FOR HABITAT DESIGN.

Abstract

Humans cannot run horizontally on the vertical wall inside a 10m diameter cylinder on Earth, but this can be done on the Moon due to 1/7 of terrestrial gravity, as recently demonstrated by emulated low gravity experiments with a rented fairground attraction. The high running speed, necessary to remain in sustainable contact to the wall, laterally generates a much higher artificial gravity, thus producing enough muscle effort and foot impacts with the (vertical) ground as to be considered a viable countermeasure for Lunar settlement inhabitants of long-lasting missions (e.g. the next phase of Artemis Program), who will otherwise face a detrimental musculo-skeletal-cardiovascular and neuromotor deconditioning. Our findings open to a new design opportunity of inhabited spaces on the Moon, which could be sized to incorporate a 'energetically passive' circular track, located in the upper internal wall, where crew members would need to horizontally run twice a day for a couple of minutes only, in order to inexpensively maintain whole body fitness.