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# REABHILITATION IN MICROGRAVITY: A NEUROPHYSIOLOGICAL APPROACH

**Abstract**

Considering that in micro-gravity demineralization (calcium loss in particular) occurs with an average of 1-2 % each 30 days, astronauts in a travel to Mars could easily encounter osteoporosis and the break of bones without the possibility of re-entry for physical rehabilitation. Starting by the research done since 2006 by the Microgymn group, this paper present investigations on the field of neurophysiological applications for physical rehabilitation during long-duration space travel in micro-gravity. Experiment in comparative states such as: parabolic flight, earth gravity and neutral buoyancy are described with the function to test possible solution and countermeasure. A strong innovation is applied proposing a new approach that apply rehabilitation with comfortable, easy to use and non-intrusive equipment based mostly on rehabilitative isometric exercise, without machine. Specific investigations are developed to emphasize changes in the recognition of afferences by the sensory and motor cortex, using also quantitative EEG. Movements capacity are also investigated. Findings will permit to create rehabilitation protocols helpful for astronauts working in zero gravity conditions.