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Yoga Therapy as a Complementary Approach to Stress Reduction and Exercise Countermeasure Effectiveness Before, During Flight and in Post-flight Rehabilitation.

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From the beginning of manned spaceflight, it was apparent that living in microgravity conditions causes specific physiological stress on the human body, requiring countermeasures to prevent these deleterious effects on the health of astronauts and protect their well-being. With more extended durations on the ISS lasting for up to six months, the changes documented on Gemini, Skylab, and Shuttle were amplified and confirmed. More sophisticated techniques suggested that living in space accelerated by as much as 10 times the rate of decrease in bone, for example -- a decrease normally seen with aging. Though a variety of countermeasures have been tested over the last 50 years, they have consistently been only partially effective. They have focused mainly on providing exercise – aerobic and resistance – according to regimes practiced in Earth’s 1G, such as a single bout of intense exercise once a day. Extending the duration and intensity has helped only marginally. Spaceflight differs from Earth in the reduced load during exercise, making it less effective. Unlike Earth, where non-exercise activities continue in 1G when exercise stops, in Space, the astronaut returns to microgravity, where non-exercise movement is ineffective. In addition to such deconditioning, stress and its endocrine response pre-flight and during space flight contribute to the physiological changes – bone and muscle loss—and more importantly, interfere with immune defenses, shown to severely compromise the health of the astronaut. Yoga, practiced for 6,000 years, incorporates natural movement, breathing and mental techniques that may be used to promote relaxation, flexibility, strength and health. Specifically, yoga therapy can be of immense value in providing training in individual stress-reducing techniques and a variety of all-day non-exercise activities before, during flight and to accelerate rehabilitation post-flight. The ability to offer the astronaut *ad libitum* stress-relieving tools and activities to complement structured exercise can provide the missing link that enhances the effectiveness of countermeasures.