

SPACE LIFE SCIENCES SYMPOSIUM (A1)
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MONITORING PROGRESSIVE DISUSE OSTEOOPENIA ATTENUATION IN 90-DAY BEDREST
WITH HEEL MECHANICAL VIBRATION USING ULTRASOUND IMAGING SCANNING**Abstract**

Osteoporosis often occurs with along with both aging and unloading (e.g., space flight and bed rest), jeopardizing mineral density, microstructure and integrity of bone, leading to an increased risk of fracture. A way to combat this deterioration is to harness the sensitivity of bone to mechanical signals. This study evaluates the longitudinal effect of a dynamic mechanical loading through the heel on human bone in vivo during 90-day bed rest, monitored using a quantitative ultrasound (QUS) imaging and dual energy X-ray absorptiometry (DXA) in localized regions of interests, i.e., calcaneus. A total of 29 bed rest subjects were evaluated (11 control, 18 treatment) with a daily low magnitude, high frequency dynamic mechanical stimulation countermeasure. Both QUS and DXA detected longitudinal bone density and quality changes. Ultrasound Velocity (UV) decreased in the control group and increased in the treatment group, with an overall increase of 1.9