# 'GOOD VIBRATIONS' MAY PREVENT BONE LOSS IN SPACE

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New NASA research suggests bones that are slightly shaken may help astronauts stay healthier during long space flights, and could be used to help people suffering from bone loss here on earth.

Scientists funded by NASA and its National Space Biomedical Research Institute in Houston uncovered evidence that barely perceptible vibrations may stimulate bone growth, which would benefit astronauts on extended space missions, the elderly here on the ground, and other people immobilized by paralysis or bed rest.

A team of researchers, lead by Dr. Clinton Rubin of the State University of New York at Stony Brook, discovered that normally active animals exposed to 10 minutes per day of low-magnitude (.25g), high frequency (90 Hz) vibrations experienced increased bone formation when compared to the control group.

In addition, when animals prevented from regular, weight-bearing activity, were exposed to 10 minutes of vibrations per day, bone formation remained at near-normal levels. However, animals not exposed to the treatment, but participated in 10minutes of weight-bearing activity each day, still exhibited signs of significant bone loss.

While preliminary results are encouraging, "a full clinical study must be completed to demonstrate the effectiveness of using vibrations to recover bone mass and architecture in people with osteoporosis or to prevent the bone loss known to occur in astronauts during long duration space flight," Rubin said.

"The technique works by stimulating the bones' stress that are placed on them," said Dr. Bruce Hather, a muscle specialist at NASA Headquarters Office of Biological and Physical Research in Washington. "The people you see working out with barbells at the local gym typically have larger muscles and stronger bones than someone who does little or no exercise."

While researchers do not fully understand the physiological mechanism at work, the vibrations appear to fool the bones into thinking they are working hard. This results in the retention, and even additional growth, of bone tissue. This research may be particularly useful for long-duration space missions of the future.

The absence of mechanical stimulation to bones and muscles in micro gravity leads to substantial bone loss and muscle weakness in astronauts. In flights lasting four to six months, astronauts can lose bone mineral density approaching 1.6% per month.

Although there has not been enough long-term research to determine if such rates of bone loss would continue, scientists estimate that during a two and a half-year round trip mission to Mars, astronauts could lose up to half of their bone density from specific parts of the skeleton. This could seriously jeopardize an astronaut's health on return to Earth.

At the same time, current astronaut exercise regimes for long-duration space missions are time consuming, eating away at valuable crew time. Low-level vibrations may offer a countermeasure for this condition without the need for a medicinal Intervention.

Other members of the research team include Gang Xu and Stefan Judex, both of the State University of New York at Stony Brook.