

The Critical Role of Physical Activity in Skeletal Development and Maintenance

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Thursday, March 29, 2007

Seminar, 9:00 – 10:00 a.m.

Discussion period, 10:00 – 10:45 a.m.

Lecture Hall, Center for Advanced Space Studies
3600 Bay Area Boulevard at Middlebrook Drive
Houston, Texas

The role of physical activity on skeletal development, maintenance and adaptation has been elucidated using theoretical computer models, animal experiments, and clinical observations. In embryonic development, cartilage condensations appear throughout the developing tissues. These cartilage rudiments subsequently grow and are mostly replaced by bone, forming the skeleton of the body. Shortly after the appearance of the embryonic cartilage, involuntary muscle contractions begin. After birth, the gravitational field and physical activities directly influence the magnitudes and directions of these forces. The intermittent forces continue to be applied throughout life and determine, to a great extent, changes in bone size and shape as well as the density and internal architecture of the bones. Changes in the gravitational field and/or physical activities during space travel can alter the applied forces and have dramatic effects on bone resorption and the development of osteoporosis. These changes in space can be predicted using theoretical models that have been developed based on changes in bone mass caused by altering physical activities on Earth.

Following the seminar, members of the audience may wish to stay for an optional discussion period from 10:00 – 10:45 a.m.

Sponsored by USRA Division of Space Life Sciences

