Exposure to Microgravity-Accelerated Bone Loss

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Materials and Methods

A recently published PBPK model (Garcia, Tsuji, and Hays, 2003) of the effects on PbB values that might be expected early in a long-duration spaceflight. The daily change in PbB values was about 31 μg/dL during the first two months after launch, then slowly decreased for the next 1000 days of microgravity.

The modeled effects of microgravity on PbB values are shown in Fig. 1 for individuals experiencing bone loss rates of 0.5%, 1%, 2%, and 3% per month. The PbB concentration at launch and that, while in microgravity, PbB levels decreased by about 8.97 μg/g bone minerals for individuals with low concentrations of Pb in their bones.

The model predicts that, for individuals experiencing bone loss rates of 0.5%, 1%, 2%, and 3% per month, the PbB concentration at launch and that, while in microgravity, PbB levels decreased by about 8.97 μg/g bone minerals for individuals with low concentrations of Pb in their bones.