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Project title: Effects of Vibratory Stimulation on Bone Architecture and Bone Mineral Density in Aging Mice

Introduction/Objectives: Vibratory exercise in the form of high frequency, low amplitude vertical oscillations has been proven to increase the bone mineral density of other animals, such as rats and sheep (1). This deterioration of bone mineral density, BMD, is a leading cause of orthopaedic pathological conditions in America (2). This experiment involves passively exercising 18-month-old C57BL/6 male mice, a model which approximates the elderly human population, for 30 minutes/day, 5 days/week, for 12 weeks with hopes of partially alleviating the effects of age on bone health.

Methods: The exercising described above was performed on an MCG-designed device designed to produce two different levels of g-load stimulation, 0.5g and 1.5g, concurrently at a frequency of 30Hz, depending on loading placement location. One group of n=9 mice was immediately sacrificed after acclimation to MCG animal facilities. Two groups of n=9 each were acclimated and then used for exercising at 0.5g and 1.5g, and one group of n=9 was used as a control with no stimulation (longitudinal control). A standard combination of testing was performed before and after their sacrifice. The testing parameters included motor coordination, DXA, serum levels of PYD, SDF1, osteocalcin, calcium intake/excretion levels, locomotor activity, microCT bone architecture imaging, biomechanical strength testing, weight, food consumption, and histomorphometry. This extensive array of tests allows the investigators to paint a more complete picture of organismal and cellular changes in response to this form of stimulation.

Results: As of the writing of this paper, the experiment is still ongoing. The project will wrap up in mid-September.

Summary/Discussion: With no official data at this time, our hypothesis that vibratory exercise on the elderly mice can reduce the loss of bone compared to our longitudinal control by either retarding bone loss or causing bone growth is still unproven.