

Do Implantable, Progestin Only Contraceptives Alter the Bone Response to Unloading?

XIMENA VARGAS, HEATHER C.M. ALLAWAY, SARAH E. LITTLE, and SUSAN BLOOMFIELD

Bone Biology Laboratory, Department of Health and Kinesiology, Texas A&M University, College Station, TX

Category: Undergraduate

Advisor / Mentor: Bloomfield, Susan (sbloom@tamu.edu) & Allaway, Heather (hcallaway@tamu.edu)

ABSTRACT

Hormonal contraception is routinely used by premenopausal women, including female astronauts, to suppress reproductive function. Long-acting reversible contraceptives (LARC-progestin only) have become a common choice amongst women due to their practicality. **PURPOSE:** Understand the interaction of unloading and LARC on bone health. We hypothesize that the decrease in bone mineral density (BMD) and cortical thickness of the tibia associated with hindlimb unloading (HU) will be lessened by LARC implantation. **METHODS:** Virgin female Sprague-Dawley rats (n=26; 4-mo-old) were singly housed and randomly assigned to placebo (PL) and LARC groups, via a slow-release etonogestrel pellet (0.00 vs. 0.09 vs. 0.17 vs. 0.30ug/d) implanted under the skin. Animals were further randomized into ambulatory (AMB) and HU subgroups (n=6-7/subgroup), with HU initiated a week following pellet insertion and lasting for 6 weeks. Ex-vivo proximal tibia metaphysis (PTM) and diaphysis (PTD) were scanned with peripheral quantitative computed tomography. Univariate ANOVA was used to determine group differences, with significance accepted at $p < 0.05$. **RESULTS:** Body weight at termination was not different among groups ($p > 0.29$). Soleus weights were significantly lower in HU compared to AMB animals ($p < 0.001$). Total and cortical BMD at the PTM were significantly lower in both HU groups compared to PL-AMB ($p < 0.05$). At the PTM there were no differences among groups for trabecular BMD, bone area (total, marrow or cortical) or cortical thickness ($p > 0.12$). Total area at the PTD was significantly different among groups ($p = 0.011$); the LARC-HU group had a larger area than the PL-HU and LARC-AMB groups ($p < 0.04$). Marrow area at the PTD was significantly different among groups ($p = 0.013$); the LARC-HU group had a larger area than LARC-AMB ($p = 0.01$). At the PTD there were no differences among groups for cortical BMD, area and thickness ($p > 0.07$). **CONCLUSION:** LARC implantation did alter the response to unloading, however, the changes were site specific. At the metaphysis the response to unloading was not altered by LARC implantation. Loss of diaphyseal total area with unloading was reduced with LARC implantation. Analyses are ongoing to further elucidate these site specific differences.