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Androgen Deficiency-induced Bone Loss Can Be Prevented by the Combined Intervention of Exercise and Genistein Administration in Mice.

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There is evidence that estrogen plays an important role in skeletal tissue in males as well as females. We have reported that phytoestrogens, such as genistein, selectively act on bone and exhibit cooperative effects on bone mass when combined with exercise in ovariectomized mice. In this study, we examined whether both interventions exhibit cooperative effects on bone loss in androgen-deficient mice similar to those in estrogen-deficient mice. Male mice aged 7 wk were either sham operated or orchidectomized (ORX) and divided into six groups: 1) sham; 2) ORX; 3) ORX and treated with genistein (0.4 mg/day) subcutaneously; 4) ORX, exercised on a treadmill daily for 30 min/day at 12 m/min; 5) ORX, given genistein, and exercised (ORX+ExG); and 6) ORX and treated with 17-estradiol (E₂). Four weeks after the intervention, seminal vesicle weight strikingly decreased in ORX mice, and it was not affected by administration of genistein or E₂. Bone mineral density of whole femur was significantly reduced by ORX, and bone loss was prevented by the combined intervention. Histomorphometric analysis showed that bone volume and trabecular thickness in the distal femoral cancellous bone were significantly lower in the ORX group than in the Sham group, and they were completely restored in the ORX+ExG group, as in the ORX with E₂ group. These results indicate that the combined intervention of moderate exercise and a low dose of genistein administration shows an additive effect in preventing bone loss in ORX mice similar to that in ovariectomized mice.