Does endurance training modify the decrease in skeletal mass and changes in the body composition with restricted caloric intake?

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*Int J Exerc Sci* 2(1): S37, 2009. The common practice among many, including athletes and military personnel, when attempting to lose weight is to limit caloric intake and also to burn off excess calories through exercise. Our goal was to measure the effects of graded reductions of energy availability on bone mass and body composition in young adult female rats. Reduced energy availability was achieved by increasing exercise energy expenditure and/or reducing caloric intake. After acclimation, 72 rats (5-mo-old) were randomly assigned to one of 6 groups. ADLIB-EX and ADLIB-SED were fed AIN-93M *ad lib.* Energy restricted, exercised groups (ER20-EX & ER40-EX) and sedentary energy-restricted groups (ER20-SED & ER40-SED) were fed modified AIN-93M with 10%, 30%, 20% and 40% respectively, with 100% of all other nutrients provided. EREX rats were treadmill exercised to expend 10% of the weekly energy. At baseline and after 12 weeks, in vivo total body dual energy x-ray absorptiometry (DEXA) scans were performed on anesthetized rats using the GE-Lunar Prodigy with small animal software to evaluate the changes in total body bone mineral content (BMC) for total body and in body composition (lean and fat mass). Three way ANOVA with post hoc tests was used to determine differences among group means. After 12 weeks, ER40-SED was the only group to suffer a decrease in body mass (-15%), lean mass (-4%), and total body BMC (-6%). Fat mass decreased in the sedentary and exercised ER40 (-68%). In conclusion, 20% ER had no negative effect on the bone composition, whereas 40% ER negatively affects cancellous bone growth in EX and SED animals. Strong correlations exist between body mass and total body BMC in exercised and sedentary groups. Fat mass is also correlated with total body BMC in both groups, whereas lean mass is only correlated to total body BMC in the exercised group. There is a correlation between energy restriction and bone loss; however, regular exercise prevents total body BMC loss with 40% ER.