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Effects of different durations of treadmill training exercise on bone mineral density in growing rats

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In this study, we aimed to investigate the effects of different durations of treadmill training exercise (daily for 30 min and 60 min) on bone mineral density (BMD) in young growing rats. Training consisted of treadmill running at 5 days per week during a period of 13 weeks. The rats in 30 min and 60 min exercise groups began to training on day 63 of life and had maintained for at least a week, with a minimal progression as a guide to the rats' training and adaptation to the treadmill. Running time was gradually increased from 15 min to 30 and 60 min per session for two exercise groups respectively. Control rats were kept in the cages at the same environmental conditions and daily inspected to control their health. At the end of 13 weeks, bone mineral densities of the bilateral tibia of all rats were measured with dual-energy X-ray absorptiometry (DEXA) (QDR 4500/W, Hologic Inc., Bedford, MA, USA) and results were evaluated. There were significantly increases in BMD of right and left tibia of rats in 30 min exercise group at post-exercise period ( $p < 0.01$  for both sides) when compared to the control group. BMD of right and left tibia of rats were also correlated with each other ( $r = 0.556$  and  $p = 0.003$ ). Otherwise, there is a positive correlation between pre- and post-exercise body weights of rats ( $r = 0.588$  and  $p = 0.002$ ). From our results, we concluded that subjects should perform moderate running exercise for development of bone mass and its protection during the lifelong. However, intensity and duration of performing exercise are required to put in order for every ages or actual physical conditions.

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