The effects of intensive, long-term treadmill running on reproductive hormones, hypothalamus-pituitary-testis axis, and semen quality: a randomized controlled study

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Abstract: Effects of intensive exercise on hypothalamus pituitary testis (HPT) axis remain controversial. Our aim was to determine the effects of intensive, long-term treadmill running on reproductive hormones, HPT axis, and semen quality. A total of 286 subjects were randomly assigned to moderate-intensity exercise (similar to 60% maximal oxygen uptake (VO2max); group 1, n = 143) and high-intensity exercise (similar to 80% VO2max; group 2, n = 143) groups. The two groups exercised for 60 weeks in five sessions per week, each session lasting 120 min. This was followed by a 36-week low intensity exercise recovery period. All subjects underwent routine semen analysis. Wood samples were drawn for the determination of the levels of the following hormones: LH, FSH, prolactin, testosterone (T), free testosterone (fT), inhibin B, and sex hormone-binding globulin (SHBG). The HPT axis was assessed using GnRH and human chorionic gonadotropin tests. After 24 weeks of exercise, the subjects exercising with high intensity demonstrated significantly declined semen parameters compared with those exercising with moderate intensity (P=0.03). Serum T and fT began to decrease, and serum SHBG began to increase at the end of 12 weeks with both moderate- and high-intensity exercises. The serum LH and FSH concentrations decreased below the baseline level at 12 weeks in both groups, (P=0.07 in group 1 and 0.03 in group 2). Both groups had blunted LH and FSH responses to GnRH. These parameters improved to their pre-exercise level during the recovery period. Long-term strenuous treadmill exercises (overtraining syndrome) have a deleterious effect on reproduction.

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