Correlation between menstrual disorders with body fat and bone quantity in female college athletes

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Purpose: The purpose of this study was to investigate the relationship between menstrual disorders with body fat and bone quantity in female college athletes.

Methods: Seventy-five female college athletes (55 softball players and 20 middle and long distance runners) participated in this study. The menstrual cycle status (normal or disorder) was assessed via a questionnaire. Bone quantity (Stiffness) has been measured via Bone Densitometer (A-1000 EXP II, GE Healthcare Ltd.).

Results: The female athletes with normal menstrual cycles (NM) represented 73.3% (softball players; 81%, middle and long distance runners; 47%), whereas 26.7% (softball players; 19%, middle and long distance runners; 53%) had menstrual cycle disorders (MD). Body fat percentage was 24.2% for the NMC athletes and 20.2% for the MD athletes. The body fat of the MD athletes was significantly lower compared to NM athletes (p < 0.01). The stiffness value was 128.9 for the NM group and 126.2 for the MD group, without significant differences between groups.

Discussion: These results indicate that in order to maintain normal menstrual cycles, it is important that female athletes control their body composition. In addition, further investigation is necessary to assess other causes of the decrease of bone quantity.

Key words: female athlete, menstrual disorder

Short-duration intermittent hypoxia enhances endurance capacity via improving fatty acid metabolism in mice

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Purpose: This study was designed to (1) investigate the effects of acute short-duration intermittent hypoxia on muscle mRNA and microRNA expression levels, and to (2) clarify how short-duration intermittent hypoxia causes additive effects on improving endurance capacity during chronic exercise training.

Methods: Exp.-1: Male ICR mice were subjected to either acute 1-h hypoxia (12% O₂), acute short-duration intermittent hypoxia (12% O₂ for 15-min, room air for 10 min, 4 times, Int-Hypo), or acute endurance exercise (Ex). Exp.-2: Mice were subjected to normoxic exercise training with or without hypoxic exposure for 3 weeks.

Results and Discussion: PGC-1α mRNA levels were significantly greater than control at 3 h post Ex and at 6 h post Int-Hypo. Expression levels of miR-23a were lower than control at 6-24 h post Int-Hypo. Training with intermittent hypoxia (IntTr) increased maximal exercise capacity greater than training alone. The HAD and total CPT activity levels were significantly enhanced after the IntTr only in deep red gastrocnemius muscle. Both PPARδ and PGC-1α mRNA levels were significantly greater in IntTr than in sedentary control. These results suggest that exercise training in normoxia with short-duration intermittent hypoxic exposure may be a beneficial strategy for increasing endurance performance via enhancing fatty acid utilization in mitochondria.

Key words: exercise training, fatty acid metabolism, intermittent hypoxia, micro RNA