

The Response of Physical Fitness Factors (Indexes) to Time Sequences of Training in Various Growth Periods

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Abstract

Response to exercise training is different in various age ranges, but are there quantitative differences in the response of physical fitness factors in children, adolescents and the youth in various stages of training with regard to training sequences? The aim of the present study was to examine these responses and to assess the effect of age as a growth factor on them. 36 male participants in three age ranges of 8-10, 12-14 and 17-19 years were randomly selected and divided into three age groups: children (8.83 ± 0.5 years), adolescents (12.5 ± 0.5 years) and youth (16.3 ± 0.6 years). The training program included endurance, strength and flexibility training 3 sessions per week for 12 weeks. Agility, modified push-up, Sargent jump, coordination, hand power, balance, cardiovascular endurance and flexibility were measured before and after the first 6 weeks of training (posttest 1) and after the second 6 weeks of training (posttest 2). The mean of data changes was analyzed by analysis of variance with repeated measures and one-way ANOVA and Bonferroni post hoc test at ($P \leq 0.05$). The results showed that most body indexes improved as intra-group changes in all groups especially in posttest 1. In addition, inter-group changes in physical indexes were observed especially in adolescent group ($P \leq 0.05$). The improvement of most physical indexes as intra-group changes in all groups especially in posttest 1 might be attributed to lower motor experiences in the beginning of the training. Also, inter-group variations in physical indexes in posttest 2 especially in adolescents were probably due to the added stress of exercise associated with developmental stress they experience during this period.

Keywords

adolescence, childhood, physical fitness, physical responses, youth.

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The Acute Effects of 30 Hours of Sleep Deprivation on and Physiological Serum Levels of C-Reactive Protein Factors of RAST Test in Active Students

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Abstract

Sleep deprivation not only damages physical performance but also elevates mortality risk, cardiovascular diseases and diabetes. The aim of this study was to investigate the effects of 30 hours of sleep deprivation on serum levels of C-reactive protein and physiological factors of RAST test in active students. The present study was semi-experimental which used a pretest-posttest design. 20 healthy male students (mean age: 20.5±3 yr, height: 171±9.5 cm, weight: 69.50±7.45 kg, and body fat: 14±2.5%) who performed physical activity at least one session per week were selected with cluster-random sampling method and were studied in two bouts. Subjects performed RAST and one repetition maximum tests 7 days before sleep deprivation and after 8 hours of complete sleep. In addition, blood samples were collected 6 minutes after RAST test in order to measure blood lactate and 30 minutes before the beginning of the tests in order to examine serum levels of C-reactive protein. These tests were performed again 7 days later after 30 hours of sleep deprivation. In order to statistically analyze the data, SPSS 20 and the dependent t test (to examine the changes within a group) were used at $P<0.05$. The results of dependent t test showed that 30 hours of sleep deprivation significantly reduced peak, mean and minimum anaerobic power while it increased significantly the serum levels of C-reactive protein, blood lactate and fatigue index ($P<0.05$). However, this sleep deprivation had no significant effects on muscle strength. It seems necessary to control active individuals and athletes' sleep in order to maintain their health and optimal physical performance. Also, it is suggested that individuals should be informed about possible side effects of sleep deprivation in order to minimize inflammatory conditions and thus possible reduction of the cardiovascular risk factors.

Keywords

anaerobic power, C-Reactive protein, fatigue index, sleep deprivation.

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The Effect of Combined and Endurance Exercise Training on Some Adipokines, GH and Lipid Profiles in Overweight Females

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Abstract

New studies show that vaspin, chemerin and Visfatin are correlated with overweight and obesity, but the effect of training on them is not clearly recognized. The aim of this study was to compare the effect of endurance and combined exercise training on plasma levels of these adipokines, GH and lipid profile in overweight females. For this propose, 45 female overweight students were voluntarily selected (age: 20 ± 2.46 yr, BMI: 29.27 ± 0.89 kg/m², %fat: 39.40 ± 3.92 , WHR: 0.91 ± 0.47). 12 subjects were assigned to interval endurance training (4 sessions a week, 60-80% HRmax, 25-45 min. interval running in each session), 11 subjects to combined training (2 days similar endurance training, 2 days resistance training: 7 stations, 60-80% 1RM, 3 sets in each station, 8-12 repetitions) and 10 subjects to the control group. Blood samples were collected in the fasting state before and after 12 weeks of exercise training to survey plasma changes of these adipokines and other variables. Results showed that visfatin and vaspin reduced significantly in combined training group compared with the two other groups while chemerin showed no difference. Also, BMI, weight, %fat in two exercised groups reduced. But WHR reduced in combined training group only ($P < 0.05$). GH significantly increased in exercise training groups in comparison with control group. Total cholesterol and TG significantly reduced only in combined training group ($P < 0.05$). GH significantly increased in combined training group in comparison with the other two groups ($P < 0.05$). It could be stated that a combination of endurance and strength training could diminish plasma concentration of visfatin, vaspin and increase GH in overweight females through the development on lipid profile factors and body composition due to weight loss and visceral fat.

Keywords

chemerin, combined exercise training, GH, overweight, vaspin, visfatin.

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The Effect of Aerobic Training on Serum Leptin Level and Iron Status in Obese Women

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Abstract

The aim of the present study was to investigate the effect of aerobic training on serum leptin level and iron status in obese women. 28 obese women were volunteered and randomly assigned to two groups: aerobic training (n=14, age 37.1 ± 4.9 yr, weight 82.0 ± 10.2 kg, body mass index 34.2 ± 4.3 kg/m²) and control ((n=14, age 37.5 ± 5.3 yr, weight 79.9 ± 9.5 kg, body mass index 34.0 ± 3.9 kg/m²). Subjects in the experimental group performed the aerobic training for 9 weeks (4 sessions per week) with 65-75% of maximum heart rate. Before and after the training period, blood samples were collected in the fasting state. The data were analyzed using independent t test and ANCOVA. Results showed no significant differences in serum leptin level between the two groups ($P > 0.05$). But aerobic training significantly increased serum iron and significantly decreased serum ferritin in the experimental group compared with the control group ($P < 0.05$). Furthermore, the other indicators of iron status including transferrin iron binding capacity (TIBC), hemoglobin, hematocrit, MCH, MCHC, and MCV showed no significant difference between the two groups ($P > 0.05$). According to the results, it can be stated that aerobic training does not have a significant effect on serum leptin level, but it can improve poor iron status in obese women. This improvement is probably due to the influence of other factors and has no relationship to serum leptin level.

Keywords

aerobic training, iron status, leptin, obesity.

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The Effect of a Single Bout of Resistance Exercise on *myoD* Gene Expression in Slow and Fast Twitch Muscles of Wistar Male Rats

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Abstract

Satellite cells are skeletal muscle stem cells that enter the cell cycle due to myotrauma. One of the activation and proliferation indicators of these cells is an increase in myoD gene expression. But there are contradictions in the response of this gene to resistance exercises in fast and slow fibers. Thus, the aim of this study was to evaluate the effect of a single bout of resistance exercise on myoD gene expression in fast and slow twitch skeletal muscles in Wistar male rats. 15 rats were obtained from Pasteur Institute and housed under natural conditions (temperature, light/dark cycle, with free access to food and water). Then, the rats were randomly divided into two groups of resistance exercise ($n=10$) and control ($n=5$). The Resistance exercise group performed a session of resistance exercise; three and six hours after the exercise, the rats were anaesthetized and killed. Then, the soleus and extensor digitorum longus (EDL) muscles were removed and to determine myoD gene expression rate, the Real time RT-PCR method was used. Data were analyzed by t test. The results showed that resistance exercise increased myoD gene expression 2.36 times (not significantly) in EDL muscle and the soleus myoD gene expression did not change significantly. It can be concluded that myoD gene in fast-twitch muscle is affected by resistance exercise faster and more than slow-twitch muscle.

Keywords

extensor digitorum longus, myoD, resistance exercise, soleus.

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The Effect of 12 Weeks of High Intensity Interval Training (HIIT) on Leptin Levels and Obesity Dependent Factors among Overweight Female Students

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Abstract

Leptin is a hormone secreted from fat tissue and plays an important role in setting cell metabolism and energy balance. The present study aimed at investigating the effect of 12 weeks of high intensity interval training (HIIT) on leptin levels and obesity dependent factors among overweight female students. In this semi-experimental study, 24 students with BMI of 25-30 kg/m² were selected purposefully and randomly divided into two groups of experimental (mean age 22.60 ± 0.97 years, weight 85.50 ± 2.37 kg, height 166.80 ± 2.82 cm) and control (mean age 23.20 ± 1.3 years, weight 82.90 ± 3.18 kg, height 168.20 ± 1.87 cm). Experimental group performed a high intensity training program for 12 weeks, 3 sessions a week with the intensity of 90 percent of maximum heart rate. Amounts of plasma leptin, weight, fat percentage, body mass index and waist to hip ratio were calculated before and after the training. Data were analyzed using Kolmogorov-Smirnov test and dependent and independent t tests at $\alpha \leq 0.05$. Results showed that 12 weeks of high intensity interval running had a significant effect ($P \leq 0.05$) on the reduction of serum levels of plasma leptin, body weight, fat percentage, BMI and WHR in the experimental group compared with the control group. It seems that high intensity interval training as a non-invasive and non-drug method can have a positive effect on the decline of leptin and some overweight and obesity dependent factors.

Keywords

BMI, Fat Percentage, High Intensity Interval Training, Leptin, Obesity, Overweight

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A Comparison of Bone Mineral Density in Menopause Athletes in Weight-Bearing and Non-Weight-Bearing Sports

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Abstract

The present casual-comparative study was carried out with the aim of comparing bone mineral density (BMD) in menopause women who were professionals in weight-bearing and non-weight-bearing sports in the past. The statistical sample consisted of 20 menopause athletes who were purposefully selected and assigned to two groups of weight-bearing and non-weight-bearing. Weight-bearing group (handball and basketball, $n=10$, mean age 54.50 ± 2.7 years, height 163.60 ± 4.69 cm, weight 70.50 ± 9.02 kg) and the non-weight-bearing group (swimming, $n=10$, mean age 54.80 ± 1.54 years, height 159 ± 5.29 cm, weight 64.55 ± 4.10 kg). The BMD was measured by dual energy X-ray absorptiometry (DEXA) and the data were analyzed by independent t test and analysis of covariance. The results showed a significant difference in BMD of femur neck, L2-L4 lumbar and total hip ($P \leq 0.001$) and femur trochanter ($P \leq 0.05$) between the two groups. The BMD of the weight-bearing group in femur neck, L2-L4 lumbar, total hip and femur trochanter was higher than that of the non-weight-bearing group. Also, there was a significant difference in BMC of weight-bearing group in femur neck, femur trochanter ($P \leq 0.001$) and total hip ($P \leq 0.05$) compared with the non-weight-bearing group. The BMC of the weight-bearing group in femur neck, femur trochanter and total hip was higher than that of the non-weight-bearing group. There were no significant differences between the two groups in other areas. According to these results, it can be concluded that weight-bearing sports which have high levels of mechanical stress in comparison with non-weight-bearing sports which have lower levels of mechanical stress increase BMD and BMC levels more in women in their middle age and menopause period. It is suggested that they should perform weight-bearing sports and inland sports as well.

Keywords

bone mineral content, bone mineral density, menopause women, non-weight-bearing, weight-bearing.

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The Effect of 6 Weeks of Endurance Training on the Levels of Some Tumor Micro-environmental Cytokines in Female Mice with Breast Cancer

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Abstract

The aim of this study was to assess the effects of sport training on cytokine balance in female mice with breast cancer. For this purpose, 20 female Balb/C mice were randomly assigned to experimental and control groups. After orientation to the environment, cancer cells were injected and experimental group performed the endurance training 5 days a week for 6 weeks with moderate intensity. Mice were daily evaluated the changes in tumor growth. Finally, the mice were sacrificed; tumor tissue was removed and immediately frozen and kept in -70°C. Tumor sample was homogenized and levels of IL-17 and IFN- γ were measured using ELISA. Independent t test was used to determine the difference between the groups. There was a significant decrease of IL-17 in the experimental group compared with the control group ($P=0.03$). Also, levels of IFN- γ increased, but it was not significant. Tumor growth significantly reduced in the experimental group compared with the control group ($P=0.005$). As IL-17 was involved in angiogenesis, growth and metastasis of tumor, decreased levels of this cytokine along with reduced tumor volume showed that training reduced tumor growth through decreasing the levels of this cytokine. Also, an increase in the level of IFN- γ showed a cytokine balance by training in tumor micro-environment to induce anti-tumor cell-mediated immunity which showed the protective role of training in provoking anti-tumor immunity. It can be concluded that endurance training played an effective role in the inhibition of tumor growth in estrogen-receptor dependent cancers.

Keywords

breast cancer, endurance training, IFN- γ , IL-17.

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