
The Effect of Concurrent (Resistance - Endurance) Training on Resting Levels of RBP4 and Insulin Resistance in Obese Middle-Age Men

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(Received: 2013/11/16, Accepted: 2013/12/17)

Abstract

The aim of this study was to examine the effect of 12 weeks of concurrent training on RBP4 and insulin resistance levels in obese middle-age men. For this purpose, 20 obese middle-age men voluntarily participated in this study and were assigned to concurrent training group (n=10, mean age 51.2 ± 2.25 yr and BMI 31.44 ± 0.81 Kg/m²) and control group (n=10, mean age 50.3 ± 2.11 yr and BMI 30.32 ± 1.34 Kg/m²). The concurrent group performed the 12-week protocol including resistance training (3 sessions per week, 50-75% of 1RM for 22 min.) and endurance training (running or walking with 50-80% HRmax for 22 min.). The results showed a significant decrease in RBP4 ($P=0.003$) and insulin resistance ($P=0.019$) after 12 weeks of concurrent training in comparison with the control group. It can be concluded that concurrent training can decrease RBP4 and insulin resistance levels. These changes may be in the line with subjects' weight loss.

Keywords

concurrent training, insulin resistance, obesity, RBP4.

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The Design of a Simulation Training Protocol of Taekwondo Competitions According to Profile of Heart Rate, Blood Lactate and Rating of Perceived Exertion (RPE) Changes

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(Received: 2014/1/6, Accepted: 2014/5/19)

Abstract

Physical injuries during taekwondo competitions often happen due to physical contacts during fighting; therefore, a training protocol was designed in line with the physiological stress of a real competition according to LA, HR and RPE changes so that the athletes could perform the techniques with a pad instead of a real opponent. For this purpose, 12 professional taekwondo players from national team (mean age 22±3 yr) participated in this study purposively. Anthropometric characteristics and aerobic capacity were estimated using an exhaustive aerobic treadmill protocol and anaerobic power was estimated by the RAST test. Subjects performed the stimulation protocol according with the Olympic weight style. Blood lactate and heart rate were measured with polar telemetry and Burg's RPE₁₀ profile before the competition, at the end of each three rounds, at the end of the third round and in stimulation protocol with pads. One-way analysis of variance was used to compare the data mean. No significant differences were observed between the two conditions of competition and simulation training in HR, LA and RPE ($P>0.05$). The stimulation protocol inserts a psychophysiological stress in line with real competitions on taekwondo players' performance; therefore, this protocol can replace preseason competitions before competitions when the incidence of injury is high.

Keywords:

blood lactate, design of simulation training, rating of perceived exertion, sports injury, taekwondo.

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An Investigation of Anthropometric and Physiological Characteristics of Junior Volleyball Players for Talent Identification Based on Playing Positions

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(Received: 2014/1/6, Accepted: 2014/5/19)

Abstract

The aim of this study was to investigate anthropometric and physiological characteristics in junior volleyball players for talent identification according to their volleyball playing positions. 15 junior national volleyball players (mean age 17.7 ± 0.3 years) participated in this study. Players were classified to five groups according to their playing positions: setters, liberoes, middle blockers, receiver attackers and opposite hitter. Then their physiological variables, anthropometric factors and somatotype characteristics were calculated. Results showed significant differences in the anthropometric profile of the players especially in height, weight, length of lower extremity, arm span, arm length, upper arm length, hand span, width shoulder, skeletal muscle mass, WHR and somatotype among different volleyball positions ($P < 0.05$). Liberoes were thinner and shorter than other players ($P < 0.05$). Opposite hitters and receiver attackers were more mesomorph than other players while middle blockers were more ectomorph ($P < 0.05$). Receiver attackers had better vertical jump performance than other groups ($P > 0.05$). There were no significant differences in other physiological and anthropometric variables among playing positions. These results suggested that more anthropometric differences exist among volleyball players in different positions and players' anthropometric characteristics, somatotype and explosive power should be taken into account during talent selection and talent identification.

Keywords:

elite, physical fitness, somatotype, talent identification, volleyball.

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High Intensity Interval Training (HIIT): Beneficial or Harmful? An Investigation of Bone Mass Density Changes after High Intensity Interval Training in Adult Male Wistar Rats

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(Received: 2014/5/1, Accepted: 2014/4/19)

Abstract

The aim of this study was to investigate the effect of high intensity interval training (HIIT) on bone mass density in adult male Wistar rats. For this purpose, 16 rats (weight 250 ± 20 g and 6 weeks old) were divided into experimental group ($n=8$) and control group ($n=8$). After a week of orientation to the training protocol, 8 weeks of incremental HIIT was performed. 24 hours after the last training session, the subjects were anesthetized and sacrificed and their femur was removed and placed in formalin. Bone mineral density (BMD, g/cm^2) and bone mineral content (BMC, g/cm^2) in three regions (neck, middle, trochanter) of the femur were measured using DEXA analysis. Independent t test was used for statistical analysis. Results showed a significant reduction in BMD and BMC at femoral neck and trunk while the reduction in trochanter BMC of the experimental group was not significant. Based on these findings, HIIT may not have desired stimulatory effects on bone mass density.

Keywords

bone mass content, bone mass density, DEXA, high intensity interval training.

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The Effect of Rest Intervals between Sets of Resistance Exercise on Plasma Antioxidant Capacity Changes and Cell Injury Index

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(Received: 2013/3/12, Accepted: 2014/1/7)

Abstract

The aim of this study was to determine the effect of rest intervals between two resistance exercise protocols (with similar volume and intensity) on plasma antioxidant capacity (TAC) and creatine kinase (CK). For this purpose, 20 untrained subjects voluntarily participated in the research and randomly assigned to one of the two resistance exercise groups with 2-minute rest interval and 4-minute rest interval. Resistance exercise was performed in four sets of six repetitions maximum (6RM). Blood samples were collected before the exercise, immediately after the exercise, 6, 24 and 48 hours after the exercise. The results indicated that both resistance exercises with different rest intervals significantly changed plasma antioxidant capacity and creatine kinase ($P \leq 0.05$). However, there was no significant difference in the TAC and CK between the groups during the study ($P > 0.05$). Generally, it can be said that rest intervals between resistance exercises cannot have an effect on redox changes and cellular damage, but the intensity of exercise *was* more important.

Keywords:

antioxidant capacity, cell injury index, resistance exercise.

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The Effect of an Aerobic Exercise Program with Two Different Volumes on Some Risk Factors of Cardiovascular Diseases in Mentally Retarded Girls

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(Received: 2013/4/6, Accepted: 2013/12/17)

Abstract

The aim of this study was to compare the effect of an aerobic exercise program with two different volumes on some risk factors of cardiovascular diseases in mentally retarded girls. 24 mentally retarded girls were randomly assigned to three groups: 1) aerobic exercise, 3 sessions per week for 45 minutes, 2) aerobic exercise, 4 sessions per week for 40 minutes, and 3) control. The experimental groups performed aerobic exercises including 10 minutes of warm-up, 30 minutes of walking, running and free games, and 5 minutes of cooling for 8 weeks with the intensity of 65-75% heart rate reserve. Data were analyzed using one-way ANOVA ($\alpha < 0.05$). Results indicated that no significant differences among the three groups in lipid profiles, heart rate, and some body composition variables (fat percentage, BMI, WC) ($P > 0.05$). To improve their cardiovascular endurance, mentally retarded girls can perform 4 sessions a week for 40 minutes, and to decrease WHR, they can apply 3 sessions a week for 45 minutes. Both volumes can be used for weight and VO_{2max} .

Keywords:

aerobic exercise, exercise volume, mental retardation, risk factors.

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The Effect of Two Methods of Endurance and Resistance Training on Plasma Apelin Levels and Some Anthropometric Variables in Overweight and Obese Girls

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(Received: 2014/2/21, Accepted: 2014/5/24)

Abstract

This study aimed at the effect of two methods of endurance and resistance training on plasma apelin levels and some anthropometric variables of overweight and obese girls. 34 overweight and obese girls ($\text{kg/m}^2 > 25$) were selected purposively and randomly divided into three groups of endurance ($n=12$) (age 22.81 ± 2.44 years, height 158.55 ± 5.33 cm and weight 76.17 ± 6.81 kg), resistance ($n=12$) (age 22.50 ± 2.67 years, height 161.60 ± 7.74 cm and weight 77.69 ± 9.92 kg) and control ($n=10$) (age 21.50 ± 2.41 years, height 159.20 ± 6.40 cm and weight 77.69 ± 1.37 kg). Endurance training of running included 8 weeks, 4 sessions a week with intensity of 65-80% HRmax and resistance training included using weights for 8 weeks, 4 sessions a week with intensity of 65-80% 1RM. Blood samples were collected in fasting state 24 hours before the training session and 48 hours after the last training session. Data were analyzed by Kolmogorov-Smirnov test, dependent t test, one-way ANOVA and LSD post hoc test at $\alpha < 0.05$. Apelin significantly decreased in the endurance group ($P=0.005$) but it did not change significantly in the resistance group. Also, There were significant differences in WHR, VO_2max and levels of apelin changes between the experimental groups and control group ($P < 0.05$). Anthropometric variables decreased significantly in both experimental groups ($P < 0.05$). The finding showed that endurance training was more effective in improving levels of apelin and obesity-related factors than resistance training.

Keywords:

anthropometric variables, apelin, endurance training, obesity, resistance training.

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Variation of Blood Pressure, Heart Rate and Oxygen Consumption and Their Relationship with Body Lipid Profile in Active and Inactive Students

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(Received: 2013/9/10, Accepted: 2014/1/12)

Abstract

This study aimed at investigating the variations of blood pressure, heart rate and oxygen consumption and their relationship with body lipid profile in active and inactive students. 10 active students (mean age 21 yr, weight 68.1 kg and height 174.1 cm) and 10 inactive students (mean age 21.5 yr, weight 73.07 kg and height 177 cm) from Shahid Rajaei Teacher Training University who volunteered to participate in the study were randomly selected. The participants performed Cunningham Faulkner submaximal treadmill test until exhaustion (slope: 20%, speed: 12.9 km/hr). Firstly, sitting systolic and diastolic blood pressures (SBP, DBP), sitting heart rate (HR), double product (DP), blood lipid, visceral fat, body fat ratio and body mass index were measured before the test. Then sitting BP and HR and DP were measured immediately after the test and after 3 minutes. The analysis of variance and covariance with repeated measures were used for data analysis. The results showed that recovery of HR ($P=0.006$, $F=6.012$), SBP ($P=0.02$, $F=4.353$) and DP ($P=0.004$, $F=6.38$) occurred more in active students. Modification of results with overweight and blood lipids showed the relationship between some of these indices and poor recovery in inactive students. So it can be stated that fitness and physical activity had positive effects on better recovery of hemodynamic indices after exercise even though no differences were observed in resting and exercise values. Overweight and dyslipidemia can partially explain some of these differences between active and inactive subjects. Thus it is recommended to control these factors by proper exercises and diets.

Keywords:

blood pressure, double product, dyslipidemia, heart rate, overweight, physical activity, recovery.

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The Effects of 8 Weeks of Intermittent Training on Lactate (La) Level and Lactate Dehydrogenase (LDH) Enzyme Activity in Male Wistar Rats

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(Received: 2014/1/13, Accepted: 2014/5/24)

Abstract

The aim of this study was to assess the effects of intermittent training on lactate level and lactate dehydrogenase enzyme activity in Wistar rats. 20 male Wistar rats (mean age 3 months and weight 224 ± 14 g) were selected and randomly divided into the training ($n=10$) and control ($n=10$) groups. The training protocol consisted of running on a treadmill for 4 minutes and then 2 minutes of active rest in 10 training phases for the experimental group. All rats were anesthetized with a mixture of ketamine and xylazine 48 hours after the last training session after an overnight fasting. To measure lactate and LDH enzyme activity, blood samples were obtained from their cardiac puncture. Data were analyzed by mean and standard deviation ($M \pm SD$) and independent t test. The results showed no significant differences in blood lactate level between the two groups, but there was a significant difference in LDH enzyme activity between the two groups ($P < 0.05$). These results indicate that intermittent training caused the clearance of lactate. Enhance of lactate replenished muscle glycogen and prevented H⁺ concentration which was produced along with lactate.

Keywords:

intermittent training, lactate (La), lactate dehydrogenase (LDH) enzyme, rat.

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The Effects of Two Kinds of Resistance Training and Detraining on Serum Levels of Myostatin, Cortisol, Testosterone and Muscle Strength of Non-Athlete Men

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(Received: 2013/11/22, Accepted: 2014/1/22)

Abstract

The aim of this study was to determine the effect of two kinds of resistance training and one period of detraining on serum levels of myostatin, cortisol, testosterone and muscle strength of non-athlete men. For this purpose, 34 non-athlete men (age 33.35 ± 2.8 yr) were divided into three groups: experimental A (4 sessions of training per week), experimental B (3 sessions of training per week) and control. The resistance training (24 sessions) was performed based on Cramer et al. (2004) including 3 sets of 8-10 repetitions with 60-70% 1RM in big muscles. Blood sampling, strength test and body composition measurement were performed before the first session, after the last session and after one period of detraining. The data were analyzed by Mix ANOVA and Tukey post hoc test. The results showed that resistance training increased muscle strength, fat free body mass and testosterone while it decreased cortisol and myostatin in both groups. This increase and decrease were higher in experimental A group than experimental B group ($P < 0.05$). Also, a period of detraining increased serum levels of myostatin and cortisol in experimental B group ($P < 0.05$). Finally, the findings showed that training frequency led to higher increase and maintenance of those changes resulted from resistance training.

Keywords:

cortisol, detraining, myostatin, resistance training, testosterone.

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The Effect of a Selected Aerobic Exercise on Some Physiological Factors in Patients with Migraine

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(Received: 2013/12/2, Accepted: 2014/6/30)

Abstract

Migraine is defined as a recurrent headache that is usually unilateral and associated with a complex neurovascular disorder and concurrent stimulation of pain pathways of trigeminal sensory nerves. The aim of this study was to investigate the effect of a selected aerobic exercise on some physiological factors in patients with migraine. 22 women with migraine (their age range 22 -53 years) were non-randomly divided into experimental ($n=13$) and control ($n=9$) groups. In addition to medical treatment, the experimental group participated in a selected exercise including 35-60 min. on a treadmill and ergometer bicycle with 50-75% HRmax, 3 sessions per week for 12 weeks. The control group received medical treatment but they were inactive and only participated in pretest and posttest. Data analysis showed that the protocol significantly reduced headache severity, CGRP and fat percentage, and significantly increased cardiovascular endurance of the experimental group ($P<0.05$). Headache severity decreased from 34.23 to 14.30, CGRP decreased from 53.50 to 48.45% in posttest, fat percentage decreased from %31.45 to %25.25 and cardiovascular endurance increased from 24.81 to 41.81 ml/kg/bw. It was concluded that in line with other medical treatments, aerobic exercise may be used as a supplementary medical treatment in patients with migraine.

Keywords:

aerobic exercise, CGRP, migraine.

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Time Dependent Effects of High Intensity Interval Training on Oxygen Uptake Kinetics in young males

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(Received: 3/11/2013, Accepted: 17/2/2014)

Abstract

The aim of this study was to determine time dependent effects of high intensity interval training (HIIT) on oxygen kinetics in young males. 40 active students were randomly assigned to four groups: one session of HIIT, two sessions of HIIT, four sessions of HIIT and control. Both HIIT and control groups performed the incremental test on an ergometer bicycle. Two days after the pretest, training groups participated in one, two and four sessions of HIIT. Two days after the end of the training protocol, posttest was carried out. Oxygen kinetics parameters were measured by gas analyzer with breath-by-breath method during the protocol, in the pretest and posttest test. The findings showed that one session of HIIT had no effects on oxygen kinetic parameters ($P>0.05$). Two sessions of HIIT improved some oxygen kinetic parameters such as VO_{2max} , oxygen deficit and time constant 2 ($P<0.05$), but it had no effects on time constant 1 ($P>0.05$). In addition, four sessions of HIIT improved all oxygen kinetic parameters: VO_{2max} , oxygen deficit, time constant 1 and 2 ($P<0.05$). It seems that four sessions of HIIT is the minimum necessary time to improve oxygen kinetic parameters and with regard to practical applications, coaches can use this type of training in their training program for faster improvement of aerobic and anaerobic performances.

Keywords:

aerobic fitness, high intensity interval training, oxygen uptake kinetics.

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