Journal of Physical Education and Sport ® (JPES), 12(2), Art 35, pp.230 - 233, 2012
online ISSN: 2247 - 806X; p-ISSN: 2247 – 8051; ISSN - L = 2247 - 8051 © JPES

Original Article

Comparing effect of intense and moderate exercise on aerobic fitness & body composition of overweight 9-12 years old boys

MASOUD NIKBAKHT[1], MOHSEN GHANBARZADEH[2], MORTEZA TAFAH[3]
[1,2,3,] Physical education faculty of Shahid Chamran university IRAN

Published online: June 22, 2012
(Accepted for publication March 10 2012)

Abstract:
The purpose of this study was specifying intensity of exercise on aerobic fitness and body composition of overweight 9-12 years old boys. 37 boys with body mass index higher than 25 were assigned in 3 groups: 1 Continuous exercise running group, 2 Sprint intervals running, 3 Control group. Exercise was performed with same consuming energy. Maximum consumed oxygen was measured via Monarch bicycle. Amount of skin wrinkle in triceps and subscapular was measured via Harpenden caliper and % fat of body via Slater equation. body fat mass and lean body mass was calculated. Results showed that maximum consumed oxygen in continuous running group and interval running group was 2.73 & 3.98 respectively. %fat decrease were 6.33% and 3.48% and %body fat mass decrease were 3.49 and 6.3 respectively in continuous running group and sprint interval running group. Only decrease in continuous running group was meaningful. Results show that aerobic fitness and body composition was improved.
Key Words: Aerobic Fitness, Body Composition, Obesity

Introduction:

One of the important goals of performing physical activities during life, especially during growth period is gaining health and increasing quality of life. Body composition and aerobic fitness are regarded as two important factors of physical fitness that are related to health. These factors will determine quality level of people and have important role in prevention from diseases. Thinkers say that doing regular physical activities can be regarded as suitable solution for improving aerobic fitness and body composition. Such changes are proved in adults. In relation to children results of some researchers have shown positive effect of regular physical activities on these two factors. Samples for results of a research showed that doing only body exercise and without intervention of diet resulted in suitable changes for aerobic fitness, body fat percentage and fat tissue in overweight 7-11 years old boys(Owens, S et al.1999). Anyway there are some contradictions in findings of children and the relation between different intensities of body exercise, aerobic fitness and fat percentage is unclear. In relation to aerobic fitness, some researchers showed that effect of exercise with high intensity is higher than effect of exercise with low intensity (Gutin, B et al. 2002). Results of other researches did not show any meaningful increase in aerobic fitness after doing exercises (Williams, C.A., Armstrong, N., Powell, J. 2000). Results of body composition are doubtful. Although doing regular physical exercises will improve body composition and will decrease weight and body fat mass (Lazzer, S. et al 2004), we have low information about effect of different exercise methods on intensity and different amounts. Results of such researches (Gutin, B., Yin, Z., Humphries, M.C., and Barbeau, P. 2005) did not show meaningful difference between high intensity and moderate exercise methods. But results of other research showed that exercise with high intensity in comparison to exercise with moderate mode has got greater effect on body composition and will cause greater decrease in body fat percentage(Gutin, B., Yin, Z., Humphries, M.C., and Barbeau, P. 2005).Thus according to present contradictions in results of researches and unclearness for effect of different exercise methods with different intensity on aerobic fitness and body composition of immature boys, the goal of this research is to compare effect of two exercise methods of intense and moderate mode on overweight 9-12 boys.

Material and Method

Statistical society of this research was 9-12 years old boy students of elementary school and sample was 37 boys having BMI higher than 25 who were in complete healthy condition. Samples randomly divided three group include: continuous running exercise groups, sprint interval running groups and control groups were 12, 11,14 people respectively. Characteristics of tests of all 3 groups are offered in table 1.

Table 1: Characteristics of Samples in 3 Research Groups

Corresponding Author: MASOUD NIKBAKHT, *Email:* nikbkht@ut.ac.ir

Variable- Groups	Continuous Running Groups	Interval Running Groups	Control Group
Height(cm)	136	135	134
Weight(kg)	48.8	49	48
BMI(kg/m^2)	26.10	26.52	26.52
Fat Percentage	21.95	22.21	21.53
Fat Mass(kg)	10.71	10.89	10.50
Fatless Mass(kg)	37.86	38.10	37.78
Vo2max(ml/kg/min)	49.17	50.23	49.89

Pretests were performed for 3 groups (experimental groups 1 & 2 and control group). Then training attended in exercise sessions for 8 weeks. Continuous running exercise group started its exercises by continuous running with intensity of 70% to 77% HRM(Vo2max 55%-65%) and sprint interval running groups run at 100m distance with intensity of 88% to 96% HRM(Vo2max 80%-90%). Rest time between repetitions is 30 seconds. Total passed distances in first session is 1000m that include 200m running with low speed for warm up, 800m running with specified intensities for each group. Testers run same distances at all 3 exercise sessions that was held weekly and by starting next week 100m distances was added to it so that at final session testers run distance of 1700m. In this research HRM was calculated via running 3 minutes with maximum speed and counting pulse. After holding exercises the testers attended at post-test and their indices were measured. In order to evaluate body composition indices including body fat percentage, body mass, fat mass and fatless mass was used. In order to calculate fat percentage for thickness of skin wrinkles at two points of triceps and subscapular the Harpenden Skin Fold Model was used. Since sum of two skins wrinkle (∑sf) in all tests is lower than 35 millimeters. By using Slater formula, body fat percentage of tests was calculated.

Fat Percentage: $1.21(\sum sf) - 0.008(\sum sf)^2 + 1$

In this research I index was regarded as – 1.7 since all tests were lower than maturity age and were white skin. In order to gain fat mass and fatless mass of tests, first fat mass was calculated via formula of :Fat Mass= Body Fat Percentage * Body Mass)

Then fatless mass with minus fat mass from total body mass was gained and also similar to previous researches Vo2max was measured as index of aerobic fitness by Monarch Bicycle. In order to leveling research groups from view point of measured variables were used from MANOVA. Also because of meaningful relation among some of measured indices, in this search have used from multi-variable variance analysis test for testing research hypothesis and have used from TOKEY Following Up Test for discriminating meaningfulness of difference among groups. Level of meaningfulness in this research was 0.05.

Results

According to statistics of F, table 2 is represented any meaningfulness among research variable.

Table 2: Results of Multi-Variable Variance Analysis in Relation to Variable

Variable	F	p
Body Mass Index	0.190	0.827
Body Fat Percentage	5.343	0.010*
Body Fat Mass	4.950	0.013*
Body Fatless Mass	2.612	0.088*
Maximum Consumed O_2	8.172	0.001*

Also In order to discriminate difference of meaningfulness among research groups have used from TOKEY Follow up Test.that is offered in fallowing results:

1-Continuous running and interval running exercise did not have meaningful effect on body mass(p:0.827).

2- there is meaningful difference of body fat percentage between continuous running exercise group and control group(p:0.008).

3- there is meaningful difference of body fat mass between continuous running exercise group and control group(p: 0.011).

4- there is meaningful difference of Maximum Consumed Oxygen between continuous running exercise group and control group(p:0.001).

5-4- there is meaningful difference of Maximum Consumed Oxygen between interval running exercise group and control group(p: 0.026).

Discussion and Conclusion:

Results show that continuous running exercise with moderate mode and intense sprint interval running exercise did not have meaningful effect on body mass of testers. Findings of present research in relation to effect of exercise on body mass are the same as results of researches of Figour Kalen et al (1998) Barbeau, et al (1999) which showed that body mass as a result of exercise will either does not change or it will have slight increase. In fact findings of this research concerning slight increase or keeping body mass after exercise in immature testers showed that doing exercises will not cause any problem in natural growth and children and teenagers. On the other hand findings of present research is different with results of research of Lemora et al (2002), Stefano Larz et al (2004) which showed that body mass will be decrease as a result of exercise that its reason is sex differences of testers or their diet. Also it is possible that cost of exercise energy in these researches will be higher than entrance energy that besides decreasing fat it will cause decrease in total body mass. Findings of this research show that body fat percentage in continuous running exercise group and sprint interval running group is decreased. But there is meaningful difference of body fat percentage between continuous running exercise group and control group. Results of present researches in relation to continuous running exercise group with moderate mode on body fat percentage; is adapted with results of researches of Gatin et al (2005), Namt et al, Gatin et al (2005), Moore et al (2003) These researches have certified positive effect of doing physical exercises on decreasing body fat percentage. Results of this research show that the more intense the sprint interval running exercises, the lower the body fat percentage of immature testers. But this effect in comparison to control group was not meaningful. In relation to comparison of continuous running exercise with moderate mode and intense sprint interval running on body fat percentage of immature testers, findings of this research are adapted with results of researches of Lemora et al (2002) which findings of that research showed that the highest level of decrease in body fat percentage is gained by doing long term exercises with moderate mode and also doing aerobic exercises.

Findings of this research show that body fat mass in continuous running exercise group with moderate mode and intense sprint interval running group is decreased. But there is meaningful difference in body fat mass between continuous running exercise group and control group. Findings of present research in relation to effect of exercise on body fat mass are adapted with findings of researches of Parizoka et al (1997), Figoro et al (1998), Gatin et al (2002) and Larz et al (2004) which show decrease of body fat mass as a result of doing exercises.

Findings of this research show that none of modern methods of continuous running exercise with moderate mode and intense sprint interval running exercise did not have meaningful effect of on body fat mass of testers. Findings of present research in relation to effect of exercise of body fatless mass is the same as results of researches of Parikoza et al (1997), Barbio et al (1999) which showed that body fatless mass as a result of doing exercises will be unchanged or it has slight increase. On the other hand findings of present research is different with findings of research of Lemora et al (2002) and Larez et al (2002)which showed body fatless mass will be decreased as a result of doing exercises that its reason is sex differences in testers or their diets. Also cost of exercise energy in this research is higher than entrance energy that besides decreasing body fat it will cause to decrease body fatless mass.

Findings of this research show that continuous running exercise with moderate mode and intense sprint interval running exercise will meaningfully increase Vo2max. Although increase of Vo2max in continuous running exercise with moderate mode testers in comparison to intense sprint interval running exercise group was greater, there is not meaningful difference between these two kinds of exercises from this point of view. Results of present research in relation to effect of exercise on Vo2max is adapted with results of previous researches that were conducted by Rowland et al (1999), Mascarenhas, L.P et al (2005) and other researchers Gutin, B.et al (2002) (2005),LeMura, L.M., Maziekas, M.(2002) Moore et al (1995) who have certified positive effect of physical activity on increase of Vo2max. but results of present research is different with results of researches of William et al (2000) and Larz et al (2004) who show that there is not meaningful change as a result of doing Vo2max exercises. The reason of difference in findings is difference of exercise methods, duration and intensity of exercises that are used in this research and also difference in age and sex of testers who have performed these exercises.

References

Barbeau, P., Gutin, B., Litaker, M., Owens, S., Riggs, S., and Okuyama, T.(1999) Correlates of individual differences in body-composition changes resulting from physical training in obes children. *American Jurnal of Clinical Nutrition,*Vol 69.4:705-711.

Figueroa-Colon, R., Mayo, M.S., Aldridge, R.A. Winder, T., Weinsier, R.L.(1998)Body composition chsnges in Caucasian and African American children and adolescents whit obesity using duale-energy X-ray Absorptiometry measurements after a 10-week weight loss program. *Obes Res,* 6 (5):326-331.

Gutin, B., Barbeau, P., Owens, s., Lemmon, C.R., Bauman, M., Allison, G., Kang, H.S., Litaker, S.L. (2002) Effects of exercise intensity on cardiovascular fitness, total body composition, and visceral adiposity of obese adolescent. *American Jurnal of clinical nutrition,* 75.5:818-826.

Gutin, B., Yin, Z., Humphries, M.C., and Barbeau, P.(2005)Relations of moderate and vigorous physical activity to fitness and fatness in adolescents. *American Journal of Clinical Nutrition*, Vol. 81, No. 4, 746-750.

Lazzer, S., Boirie, Y., Montaurier, C., Vernet, G., Meyer, M., Vermorel, M.(2004) A weight reduction program preserve Fat-Free Mass but not Metabolic rate in obese adolescent*. Obesity Research*.12:233-240.

LeMura, L.M., Maziekas, M.T.(2002) Factors that alter the body fat, body mass, and fat-free mass in pediatric obesity. *Med Sci Sport Exerc*, 34 (3):487-496.

Lazzer, S., Boirie, Y., Montaurier, C., Vernet, G., Meyer, M.(2004)Vermorel, M. A weight reduction program preserve Fat-Free Mass but not Metabolic rate in obese adolescent*. Obesity Research.* 12:233-240.

LeMura, L.M., Maziekas, M.T.(2002) Factors that alter the body fat, body mass, and fat-free mass in pediatric obesity. *Med Sci Sport Exerc*, 34 (3):487-496.

Moore, L.L., Nguyen, U.D.T., Rothman, K.J., Cupples, L.A., Ellison, R.C. (1995) Preschhol physical activity level and change in body fatness in young children: The Framingham Children's Study. *Am J Epidemiol ,* 142.9:982-988.

Mascarenhas, L.P.G., Salgueirosa, F.D.M., Nunes, G.F., Martins, P.A., Neto, A.S., Campos, W.D. (2005)Relationship between different rates of physical activity and adiposity predictors in male and female adolescent. *Rev Bras Med Esporte*, 11. 4.

Nemet, D., Barkan, S., Epstein, Y., Friedland, O., Kowen, G. Eliakim, A.(2005) Short- and long-term beneficial effects of a combined dietary-behavioral-physical activity intervention for the treatment of childhood obesity*. Pediatrics*, 115 (4):e443-449.

Owens, S., Gutin, B., Allison, J., et al.(1999)Effect of physical training on total and visceral fat in obese children*. Med Sci Sports Exerc*, 31:143-148.

Rowland, A.V., Eston, R.G., Ingledew, D.K.(1999) Realationship betveen activity levels, aerobic fitness, and body fat in 8- to 10-yr-old children. J Apple Physiol, 86:1428-1435.

Williams, C.A., Armstrong, N., Powell, J.(2000) Aerobic responses of prepubertal boys to tow modes of training. *Br J Sports Med*, 34:168-173.