IJBPAS, February, 2016, 5(2), Special Issue: 337-342

ISSN: 2277–4998

International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS)

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

THE EFFECT OF EIGHT WEEKS OF AEROBIC TRAINING ON STRENGTH, SPEED, AGILITY AND ANAEROBIC POWER IN BOY STUDENTS

[1]HANIYEH KHORRAM, [2*]RAZIYEH ASAYESH, [3]NAJMEH ABDOLI, [4]MAHNIA PASHANG

1- Teacher at Department of Educational I District Bandarabbas

2- Teacher at Department of Education, Jahrom, Fars Province

3- Teacher at Department of Education, Joyom, Fars Province

4- Teacher at Department of Educational I District Bandarabbas

Corresponding Author: Raziyeh Asayesh *

ABSTRACT

The purpose of the present study was to investigate the effect of eight weeks of aerobic training on strength, speed, agility and anaerobic power in boy students. The subjects included 30 volunteer boy students with an average of 16.22±2.53 age, 163.60±6.65 height, 58.87±7.78 weight and 24.23±2.65 BMI. Subjects performed aerobic running for 3 days a week, and 45 minutes every day with 70 to 80 percent of maximum heart rate. Statistical analysis was performed using paired t-test and the significance level was considered ($P<0.05$). The results showed that aerobic exercise had significant effects on strength ($P<0.001$), speed ($P<0.001$), agility ($P<0.001$), and anaerobic power ($P<0.001$). The results show that aerobic exercise increases and improves physical fitness by increasing capillary density, muscle mass, maximum oxygen consumption and decreasing fat percentage, if the exercise is of sufficient intensity and duration.

Keywords: Aerobic training, strength, speed, agility, anaerobic power

INTRODUCTION

In recent decade, physical education in schools was very highly regarded due to its important role in athletic success and public health and experts believe the basis of every country's sport takes shape from the schools physical education. Since about one-third of the population is being trained in schools across the country, the Ministry

of Education has a very important duty in individuals' educational, social, and physical guidance (Brynteson, 1980).

On the other hand, one of the main objectives of physical education in schools is its relationship to health and proper functioning of the students' body in doing homework and daily activities. An active lifestyle along with health and good habits such as getting enough rest, proper and adequate nutrition and, most importantly, regular and appropriate physical activity is effective in this process (Virgilio, 1997).

Physical fitness is a set of intrinsic and acquired abilities, which determine the physical activity, and develop all-round endurance and power, strength, speed and agility, flexibility and coordination. The exercises also should include psychological aspects of social performance improvement (Chou, 2001).

Evidence suggests that the balance between physical fitness and body composition is necessary for better compatibility with the environment. If people do not have favorable conditions in terms of physical condition and body composition, they will usually be loners, pessimistic and isolated and will not be in good mental balance (Lozoff, 1999).

Generally, to develop specific components of physical fitness exercises can be performed in a regular and organized manner. Exercise sessions should provide stimulation for development of physical fitness components and should allow the body to develop certain functions when exposed (Gaeni, 2009).

Physical activity means moving the body and using its large muscles to work and burn energy. In this regard, aerobic training is a kind of physical activity that aims to achieve a fit body and maintain physical fitness (Afzalipour, 2002).

Aerobic training is exercises that increase aerobic system energy production by oxidative phosphorylation and thereby improve cardiorespiratory endurance (Robergs, 2000). On the other hand, choosing appropriate training exercises is of great importance due to its effect on cardiovascular endurance, muscle strength and endurance, mental performance and social and psychological factors (Brand, 1992). As mentioned above aerobic training helps to improve physiological and psychological health but choosing exercises with intensity, duration, different periods and considering participants' age and body can have different effects on people's physiological factors. Therefore, the aim of this study was to investigate the effect of eight weeks of aerobic running with 70 to 80 percent of maximum heart rate on physical fitness of 16-18-year-old boy students.

MATERIALS AND METHODS

This study is of applied type and the data collection method is quasi-experimental. The subjects of the study were 30 volunteer boy students with an average of 16.22±2.53 age, 163.60±6.65 height, 58.87±7.78 weight and 24.23±2.65 BMI. The eight-week aerobic exercise program included running three times a week on non-consecutive days, for 45 minutes every day with 70 to 80 percent of maximum heart rate. Warm-up and cool-down stretching exercises was performed for 15 minutes before and after the training sections. One day before and one day after the start and end of the training, physical fitness tests including strength (long jump test), speed (run 36 m), agility (six-sided test) and anaerobic power (sargent jump) were conducted as pre-test and post-test, respectively.

Methods for measuring variables

Weight and height of the subjects were measured with scorpion scale and the standard Japanese stadiometer in barefoot and minimal clothing condition (weight in kilograms with 1.0 kg and height in cm with 1.0 mm accuracy) and were recorded in special data sheets. The body mass index was calculated as the ratio of weight (kg) to the square of the height (m).

Statistical Methods

Subjects' characteristics and the study data were analyzed using descriptive statistics in the form of tables and graphs. After confirming normal distribution of both groups' data by Kolomograve-Smirnov test, paired t-test was used for means variation at the significant level of $p \leq 0.05$. All statistical analysis was performed using the spss version 18.

RESULTS

Within-group comparison of research variables is presented in table 1. The findings showed that eight weeks of aerobic training resulted in significant changes in boy students' health.

Table 1: Comparison of within-group variables (Means±Sd)

Parameter	phase	Plyometric Training	P-value
long jump test	pre	151.12±1.83	0.001
	post	167.14±2.14	
Run 36 m test	Pre	6.80±0.21	0.001
	Post	5.01±0.62	
Agility test	Pre	30.54±1.12	0.001
	post	28.47±2.43	
sargent jump	Pre	25.70±6.74	0.001
	post	31.47±3.37	

DISCUSSION

In this study the effect of eight weeks of aerobic training on strength (long jump test), speed (run 36 m), agility (six-sided test) and anaerobic power (sargent jump) male non-athletes were studied. The results showed that aerobic training could improve the physical fitness factors.

Appropriate physical activity is one of the simplest ways of achieving desirable level of health and weight because about one third of daily energy is spent on physical

activities and when people are very active two-thirds to three-quarters of this energy will be consumed (Bar-or, 1983). World Health Organization defines health as a state of physical, mental and social well-being and not as lack of illness (Erikson, 1972). Epidemiological studies in the last 50 years have shown that low physical fitness in childhood and adolescence is related with overall mortality, cardiovascular disease and diabetes in adulthood (Robergs, 2000).

Health-related physical fitness helps to develop properties needed for good performance and a healthy lifestyle and includes muscular power and endurance, cardio respiratory endurance, flexibility and body composition. The anthropometric factors such as body weight and body fat percentage are also closely related to health and life expectancy (Wilmore, 1994).

Aerobic exercise increases muscle oxygen consumption and the heart's ability to drive the blood. Slow start and gradual progress is one of the principles of aerobic training. On the other hand, power is one of the most important components in muscle fitness program and includes strength and speed. Therefore, The increase in strength or speed can increase the power (Burgomaster, 2005). In other words, we can say that aerobic training causes adaptations in the body, including increase in muscle glycogen resources, increase in muscle triglyceride reserves as well as increase in available fat as fuel. In addition, aerobic training increases cardiac output, cytochrome concentration, myoglobin concentration, mitochondrial enzymes, mitochondrial density, lung capacity and oxygen transfer (Macpherson, 2011). Generally, it can be concluded that all these changes help the individual perform a certain motion in a shorter time. In other words, practice increases individual's physical fitness so that he can continue to perform physical activities with high intensity and with a relatively high oxygen consumption without higher blood lactate than rest time (Hazel, 2010). Hence, It is likely that the progress in the training group in this research is the result of these changes. Aerobic training causes compatibilities in these resources, which enhance muscle system performance and physical fitness in boy students.

REFERENCES

1. Afzalipour Mohammad Esmaeel, Mirkazmy Syedeh Azra, Assessment the physical condition and preparation of Birjand University students norms, Olympics, 10year, 2002, No. 1 & 2 (21) (In Persian).
2. Robergs RA., Robert SO., MacGraw Hill, Fundamental

Principles of Exercise Physiology, USA, 2000.

3. Hazell T.J, Macpherson RE, Gravell BM., Lemon PW., 10 or 30-s sprint interval training bouts enhances both aerobic and anaerobic performance. PMID, 2010, 20424855 [Pub. Medindexed for MEDLINE].
4. Macpherson RE,Hazell TJ,Olver TD,PatersonDH,Lemon PW,Run sprint interval training improves aerobic performance but not maximal cardiac output, PMID, 2011, 20473222 [PubMed-indexed for MEDLINE].
5. Robergs RA., Robert SO., MacGraw Hill, Fundamental Principles of Exercise Physiology, USA, 2000.
6. Bar-or O, pediatric sports medicine for the practitioner: from physiologic principles to clinical applications, New York Springer-Verlag, 1983.
7. Erikson BOT physical training, oxygen supply and muscle metabolism in 11-13 year old boys, Physioiligiaca Scandinavia, supple. 1972, 384.
8. Burgomaster KA,Hughes SC, Heigenhauser G.J., Bradwell S.N, Gibala M.J., Six session of sprint interval training increases muscle oxidative potential and cycle endurance capacity in humans, PMID 2005,15705728 [PubMed-index for MEDLINE].
9. Wilmore Jack H., Costill D.L, Physiology of sport and exercise, Champaing IL: Human Kinetics Publications, 1994.
10. Lozoff B, Jimenez E, wolf Am. long-term development out come of infants with iron dificincy. New England journal Medicine,1991; sep5,325.
11. Gaeni A, Dabidi Rushan V. In translated : Basics of physical physiology(Energy, compatibilities and physical functions)Rabert A, Raber Gez, Scot A, Raberts A, Fourth Edition. Tehran: Ershad Ministry, 2009; page 10.
12. Brynteson, P, Hong, J, and Schollmeier, S (1980). Changes in knowledge, fitness, and attitudeas a result of a college health fitness course. Tulsa Oklahoma, oral Roberts university. (ERIC document Reproduction service no ED 217007).
13. Virgilio,J.Stephen,(1997).Fitness education for children: A team approach. Human kinetics

14. Chou,Chien,Chih (2001). The effect of a health – related fitness education intervention on
15. Taiwanese high school student's fitness knowledge, physical activity time, and satisfaction of physical education. Ab 301-341.
16. Brand on JH, Loftin, J.M (1992.) Relationship of fitness to depression, state and trail anxiety. International health focus of control, and self – control. Percept mot skills ; 73(2) : 563-568.