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Voleybol Antrenmanlarının 11-14 Yaş Grubu Kız Öğrencilerin Bazı Solunum ve Dolaşım Parametreleri Üzerine Etkileri

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Özet

Bu çalışmanın amacı İzmir ili Karabağlar Bölgesi İlköğretim okullarında öğrenim gören 11–14 yaşlarındaki voleybolcu öğrencilere uygulanan antrenmanların öğrencilerin solunum ve dolaşım sistemlerine olan etkilerini araştırmaktır. Çalışmaya yaş ortalamaları 12,93 ± 0,74 olan 42 kız öğrenci ile aynı okullarda spor yapmayan, yaş ortalamaları 12,46 ± 0,91 olan 36 kız öğrenci gönüllü olarak katılmıştır. Voleybolcu öğrenciler, en az 2 yıl süresince haftada 3 gün, günde 90 dk., düzenli olarak antrenman yapmış, kontrol grubundaki öğrenciler ise bu süre içerisinde hiç bir fiziksel aktivitede bulunmamışlardır. Grupların yaş, boy uzunluğu, vücut ağırlığı, istirahat nabız değerleri, sistolik-diastolik kan basıncı ölçümleri ile solunum sistemlerinde yer alan vital kapasite (VC), zorlu vital kapasite (FVC), zorlu ekspirasyon volüm (FEV1) ve maksimum istemli ventilasyon (MVV) değerleri ölçülmüştür. Elde edilen veriler bilgisayar ortamında SPSS 11.0 istatistik programında t-test yöntemi ile güven aralığı $p<0,05$, $p<0,01$ düzeyinde araştırılmıştır. Gruplar arasında yaş, boy uzunluğu, vücut ağırlığı ve diastolik kan basıncı değerlerinde anlamlı farklılık olmadığı saptanmış ($p>0,05$), istirahat nabzı, sistolik kan basıncı değerleri ($p<0,01$) ile vital kapasite, zorlu vital kapasite, zorlu ekspirasyon volüm ve maksimum istemli ventilasyon değerlerinde ($p<0,05$) anlamlı farklılıklar bulunmuştur. Sonuç olarak; 11-14 yaşlarındaki voleybol sporuyla uğraşan kız öğrencilerin istirahat kalp atım sayıları ve kan basınç değerlerinin spor yapmayan öğrencilerin değerlerinden daha düşük dolduğu tespit edilirken, solunum değerlerinden VC, FVC, FEV1 ve MVV değerlerinin ise daha yüksek olduğu görülmüştür.

Anahtar Sözcükler: çocuk ve spor, voleybol, dolaşım, solunum

Examining Effects of Volleyball Trainings on Some Respiration and Circulation Parameters of 11-14 Years Old Female Test Subjects

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Abstract

The aim of this study is to determine the effects of the training done by the students on their respiration and blood circulation systems who plays volleyball, aged 11-14, at Izmir. 42 students doing sports average age 12.93 ± 0.74 and 36 students not doing any sports, with the age average 12.46 ± 0.91, voluntary involved in this study, which aims to determine the effects of the training done by test subjects on respiration and blood circulation systems. Parameters of age, height, weight, resting pulse measures, systolic-diastolic blood pressure, and vital capacity (VC), force vital capacity (FVC), force expiration volume (FEV), and maximum voluntary ventilation (MVV) values of respiration system were recorded. Findings obtained by SPSS 11.0 statistics program. The differences between the averages of groups were examined with independent t test at 0.01 and 0.05 levels. The differences between groups in terms of age, height, weight and diastolic blood pressure valves are not significant. There were significant difference on resting pulse and systolic blood pressure, vital capacity, force vital capacity and force expiration volume, maximum voluntary ventilation values of experimental group. In conclusion, resting pulse and blood pressure values of the students, who do training, were found to be lower; the respiration values VC, FVC, FEV1 and MVV were higher than those of the students not doing sports.

Key Words: child and sports, volleyball, circulation, respiration

Introduction

Sport is accepted as an activity to maintain a healthy life by people. Exercises and sports make physiological and psychological adaptations to maintain efficient and healthy life and to increase the life quality of families and especially of children. Different training methods, which are applied to develop those adaptations, show the importance of training science.

Sports activities, those played at the childhood ages regularly, play an important role on developing and maintaining healthy and physically good persons. All children should have specific physical activities to have healthy growth and development period. Children, who participates sport activities at the school ages, may adopt sports in their life as a habit when they grow up. Sport activities make children to have self confidence b revealing their creative specialties. Self confidence play an important role on children to make them being social. Personal development and being social maintain for whole life (Açıkada et al., 1990; Ergun et al., 1997). Therefore, the aim of exercises and sport activities, those applied on children, should be developing children's sportive performances, which are composed of kinetic features of them, and developing their cognitive and affective behaviors.

It's been found by the researchers that applying training programs regularly causes to have positive effects on respiration, circulation and blood parameters. The most significant effect of trainings is that sportsmen oxygen diffusion capacities are increased. This capacity indicates the speed oxygen diffusion from alveolus to blood (Somal, 1988; Astrand, 1986).

There are significant increases on developing of Max VO_2, respiration volume and frequency by trainings. Researchers show that application of 7-13 weeks trainings increase the development of Max VO_2 over %10 (Tamer, 1995).

Aerobic strength, which is the most important indicator of physical suitability and has a close relation with cardiovascular system, is one of the most important physiological criteria that specifies the performance of the sportsmen. Especially applying aerobic trainings regularly has a positive effects on blood, heartbeat volume and hemoglobin values. The increase of heartbeat volume has effects on decreasing pulse, transportation of O_2 to the muscles while applying maximal exercises, and using O_2 by cells to produce energy. The increase of lung volume and capacities increases the movement of O_2 from lungs to blood (Günay et al., 2001; Hartung et al., 1995). The increase of blood volume and exchange of O_2 at cell level depends on features of exercises those applied (Horswill et al., 1988). It has been discovered by researchers that aerobic exercises are very effective on those situations (Nieman, 1989).

The scope of this study is to examine some circulation and respiration parameters of 11-14 years old age category female test subjects, those had volleyball trainings regularly.

Materials and Methods

Test subjects, who are female students of elementary schools in Karabağlar territory of Izmir city, were voluntary to be included in this study. Experimental group, who are 42 female students those had attended to volleyball trainings regularly at least 90 mins. per day, 3 days per week for minimum 2 years, has the mean of age with 12.93±0.74; control group, who are 36 female students those doesn't play sports, has the mean of age with 12.46±0.91 years old.

Trainings were designed to develop the basic and secondary biyomotor talents due to specifications of volleyball sport branch. Trainings, those applied at first year, were based to

develop secondary biyomotor talents such as rhythm, balance and coordination flexibility. Trainings, those applied at second year, were designed to develop basic biyomotor talents such as strength, speed and power. Control group didn't have trainings except their body education lessons at school. The measurements of height, weight, resting pulse, systolic, diastolic blood pressure values, vital capacity (VC), forced vital capacity (FVC), forced expiration volume (FEV1) and maximum voluntary ventilation (MVV) of both groups were recorded.

Data Collecting Tools

Height measures of groups were recorded by a height measuring scale in 1mm precision. Weights were recorded by an electronic weighting machine. Body mass index (BMI) was calculated by using weight in kg unit and height in meter unit. The following formula was used to calculate BMI.

BMI (kg/ mt^2) = Weight (kg) / Height^2 (mt^2)

Lung function values were taken by Microlab ML3300 branded spirometer. Spirometer measurement was done by the following procedures; subjects nose were hold by a ratchet, after a deep inspiration and strong expiration, the value written on spirometer's digital screen was recorded. All measurements were replied for 3 times and best values were recorded.

While test subjects were sitting, by putting a stethoscope on to heart, heartbeats counted for 15 seconds by the help of a chronometer to take pulse value measurement. This process replied for 3 times and the best value was recorded. Resting pulse measurements of groups were taken by an aneroid sphygmomanometer and stethoscope in mmHg unit. Before this test, test subjects had rested for 10 minutes.

Data Analysis

Data analyzed by SPSS 11.0 package program. The difference of all variables' means between experimental and control group were analyzed by using t test at 0.01 and 0.05 level ($p<0.01$, $p<0.05$).

Results

Table 1. Test results of experimental and control groups.

VARIABLES	GROUP	N	$\overline{X}$	SD	T-TEST
Age (Year)	Experimental	42	12,93	0,96	0,060
	Control	36	12,46	0,59	
Height (cm)	Experimental	42	155,12	11,43	1,157
	Control	36	153,23	12,45	
Weight (kg)	Experimental	42	45,02	11,66	0,777
	Control	36	44,17	11,16	
BMI (kg/m2)	Experimental	42	16,92	2,09	0,541
	Control	36	18,87	2,48	
Rest. Heart Beat (beat/min.)	Experimental	42	78,36	4,37	0,001*
	Control	36	82,69	14,29	
Systolic Blood Press. (mmHg)	Experimental	42	121,02	3,96	0,003*
	Control	36	114,78	13,83	
Diastolic Blood Press. (mmHg)	Experimental	42	67,94	7,87	0,076
	Control	36	75,32	10,41	
VC(L)	Experimental	42	2,86	0,07	0,043**
	Control	36	1,93	6,01	
FVC(L)	Experimental	42	2,74	6,36	0,021**
	Control	36	2,01	0,13	
FEV_1(L)	Experimental	42	3,17	2,42	0,018**
	Control	36	2,12	1,35	
MVV(L/d)	Experimental	42	110,95	131,24	0,020**
	Control	36	74,2	23,95	

*(P<0.01) ** (P<0.05)

Discussion and Conclusion

Results show that there are no significant differences on the means of age, height, weight, body mass index (BMI) between experimental and control groups ($p>0.05$). It can be said that control and experimental groups have similar physical features.

The results of resting pulse variables show that experimental groups' values are lower than control groups' values ($p>0.01$). Cicioğlu et al. (1997) indicated 14-15 years old table tennis players as test subjects, whose resting pulse average was 77.5 beat/min., in their study. Alpay et al.'s (2007) study also has similar results as ours. Astrand et al. (1986) indicated in their study that the reason of low heartbeat number is having a large volume of heart which becomes larger by long term aerobic strength trainings.

Systolic blood pressure results show that experimental group has higher values than control group ($p>0.01$) but there was no changes on diastolic blood pressure variables between experimental and control group ($p>0.05$). Because of exercises have vasoconstriction effect on veins, during training period, blood pressure rises; and because of the effect of vasodilatation on veins during resting period, blood pressure decreases. This is related to circulation system adapts to trainings (Hazar, 2000).

Ziyagil et al. (1996) indicated in their study, which included Turkish national youth wrestling team as test subjects, that resting diastolic blood pressure average was 67.33±9.47 mmHg, and the average of resting systolic blood pressure values is 100.5±9.2 mmHg. Kutlu et al. (1995) indicated in their study, which included Turkish national freestyle and Greco Roman wrestlers as test subjects, that resting diastolic blood pressure and resting systolic blood pressure averages were 69.47±9.65 mmHg and 102.3±11.7 mmHg respectively. Most researchers' results are as similar as ours.

On respiration function test measurement results, which are vital capacity (VC), forced vital capacity (FVC), forced expiration volume (FEV1) and maximum voluntary ventilation (MVV), show that experimental group'svalues are higher than control group's values. This situation can be explained by the positive effects of aerobic exercises which are applied regularly, on respiration system.

Harre (1982) indicated in his study, which included 14-18 years old trained and untrained children as test subjects, that vital capacity average of trained and untrained children were 3.7 lt/min. and 2.9 lt/min. respectively. Kutlu et al. (1995) indicated in their study, which included wrestlers as test subjects, that vital capacity average was 4.08±0.881 lt/min. Gözü et al. (1988) claimed that exercises increase the vital capacity. All results in our study are as similar as literature data.

Moğulkoç et al.'s (1997) research, which included 16 years old athletes as test subjects, and Erdil et al.'s (1984) research, which included elite table tennis players as test subjects, show that the average of forced vital capacity values of experimental group's were higher than the average of control group's forced vital capacity values. Tamer (1995) discovered that sportsmen had different forced vital capacity values before and after trainings. The reason of children who play sports have higher values of forced vital capacity than the children who don't play sports can be explained by the effects of trainings on muscles of respiration, vital capacity; thus, increasing on forced vital capacity and strengthened phrenic muscles (Hancox et al., 2004).

Tunay et al. (2004) indicated in their study, which included children basketball players and sedanter children as test subjects, that the means of FEV1 values of basketball players and sedanter children are 2.37±0.41 lt. and 1.62±0.31 lt. respectively. Çoksevim et al. (2002) indicated the mean of FEV1 values of children was 2.82±0.816 lt. The results of our study have similarity with other studies' results.

Researches on children show that trainings rise the values of maximum voluntarily ventilation (Baltacı et al, 1997). Our findings are as similar as literature data.

In conclusion, volleyball trainings, which areapplied regularly, have positive effects on some respiration and circulation systems of 11-14 years old children. There should be research projects such as ours with high population of test subjects to achieve with some other circulation and respiration long term chronicle values.

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