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The Effect of Wrestling Education on Some Physical and Motoric Parameters in High School Students

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Abstract

The aim of this study is to examine the effect of wrestling education on some physical and motoric parameters in high school students. 42 volunteer men aged 15-17, who received regular wrestling training, participated in the study. In the study, after all, subjects were divided into 3 groups according to age groups, body weight, height, BMI, claw, back, leg strength, 10 and 30 m sprint, flexibility, anaerobic power, fat percentage, and body circumference measurements were taken. SPSS 20.0 program was used in the statistical analysis of the data obtained, the normality distribution of the data was determined by the Shapiro-Wilk test. Descriptive statistics, One Way ANOVA was used for normally distributed data and the level of significance was taken as $p<0.05$. When the findings were examined, there was a significant difference between the age variable and BMI, 30m sprint, anaerobic power, shoulder and chest circumference ($p<0.05$), while there were no significant differences in height, weight, claw, back, leg strength, 10 m sprint, flexibility, fat percentage, waist, hip and femur values ($p>0.05$). In conclusion, besides the effect of growth in the adolescent period in different age groups, it can be said that wrestling education has positive effects on BMI, 30 m sprint, anaerobic power, and some environmental measurements.

Keywords: high school student, wrestling education, male

1. Introduction

The adolescent period is a special and important period in which growth and development are the fastest and involves transition from childhood to adulthood (Pekcan, 2004). In individuals in the high school age group; features such as body composition, height, muscle mass, body fat percentage, strength, speed, flexibility, coordinative abilities constantly change (Çoknaz, 2017). It is supported by the literature that regular sports training has positive effects on physiological and psychological features (Günay et al., 2013). The regular exercise performed in this period; it has positive effects such as cardiovascular health, respiratory parameters, effective communication skills, strengthening of muscle, bone and joint structure, coping with stress, protection against diseases by providing positive effects on immunity (Çoknaz, 2017). In addition, while sports training from an early age positively affects the quality of life of the individual, it plays an important role in the emergence of talented athletes and determining the country's sports policy (Alıcı & İri, 2015).

A significant increase in physical motor performance is observed with regular sports training in the 15-17 age group (Günay et al., 2018). Increasing the resistance to physical and physiological fatigue caused by static and dynamic forces without decreasing the efficiency of the individuals who are trained in sports is important in terms of the effective performance of the sport. Anaerobic loadings are important especially in sports education between the ages of 15-16 (Açak, 2001). Sports training performed in this period varies according to the branch applied. Individuals who received wrestling training are expected to develop muscular strength, rapid reaction time, neuromuscular coordination, static, dynamic balance, high anaerobic capacity and arm, leg and trunk muscles, and these features are important in terms of performance improvement in athletes training in wrestling (Alpay & Hazar, 2006; Weineck, 1998). The wrestling branch develops largely due to body strength and it is seen that the results of the evaluations based on body weight criteria are among the strongest athletes in the wrestlers (Baykuş, 1989). In a study examining physical and physiological gains in wrestlers aged 15-17, it was found that there were significant differences in height, anaerobic power, FVC, reaction time, leg strength, push-ups, and shuttle test values in subjects after wrestling training during 9.5 months (Cicioğlu et al., 2007).

Individuals who received wrestling training throughout the season are expected to increase their physical and motoric performance. In this study, it was aimed to examine the effect of wrestling education on some physical and motoric parameters in high school students.

2. Methods

This study included 42 competitor wrestlers aged 15-17, at the age of high school education (Table 1). Measurements were made at the beginning of the preparatory period. In addition, the volunteer approval form was taken from the wrestler students and the criteria specified in the Helsinki Declaration were respected.

2.1 Bodyweight, Height, Body Mass İndex (BMI) Measurements

The subjects have been weighed in up to 20-grams sensitive weighbridge with bare feet and shorts only. Length measurements have been taken with the Holtain slide calipers while the subjects were standing in upright position having the calipers that slide along the scale adjusted so that they can touch the heads and read with an accuracy of 1 mm in length. This net body weight was then used to calculate body mass index , BMI (kg/m2 = Body weight (kg) / Length (m^2) (Inokuchi et al., 2006).

2.2 Body Environmental Measurements

Body environmental measurements of the wrestlers participating in the research were made with an anthropometric tape measure (Gulick meter) with precision measurement of ± 1 mm from the determined regions (Demirhan et al., 2019).

2.3 Sprint Performance Tests (10-30M)

The subjects were held ready at the exit point. When the subjects felt they were ready, they ran the distance (1-30 m) using maximal velocities. The time between start and end was determined by photocell (New Test 2000, Oulu, Finland). Tests were applied to subjects three times and the best performance value was analyzed (Demirhan et al., 2019).

2.4 Anaerobic Power

An anaerobic power calculation was calculated using Lewis Formula (Tamer, 2000; Fox et al., 1988). Three trials were given. The maximum value among the 3 readings was used to calculate the anaerobic power by the Lewis formula. A.P. = √4.9 x body weight (kg) x √ high jump distance (m)

2.5 Body Fat Ratio Measurements

Body Fat ratios of athletes were defined by determining the chest, triceps, subscapular, suprailiac, abdomen and thigh skinfold thickness and by measuring the fat percentage calculated using the following formula Percentage of fat = (Σ skin folds × 0.097) 3.64 (Özer, 1993).

2.6 Flexibility Measurements

Flexibility values of the subjects were measured with the help of the Lafayette brand test bench, that length is 35 cm, width is 45 cm and height is 32 cm. It was made to reach forward from the trunk without bending the knees and trying to reach the farthest point. The best result was recorded in cm by doing two reps (Sökmen et al., 2013).

2.7 Force Measurements

Paw forces of the subjects were measured using a hand dynamometer. An electronic dynamometer capable of measuring between 20-300 kg was used for back and leg force measurements. Two measurements were made for each subject and the best value on the indicator was recorded in kg (Poyraz et al., 2015).

2.8 Statistical Evaluation

SPSS 20.0 program was used in the statistical analysis of the data obtained, the normality distribution of the data was determined by the Shapiro-Wilk test. Descriptive statistics, One Way ANOVA was used for normally distributed data and the level of significance was taken as $p<0.05$.

3. Results

Table 1. Comparison of physical and motoric parameters of ındividuals wrestling training according to age variable

		Sum of squares	sd	Average of squares	f	p	Significant difference
Weight	Between Groups	302.89	2	151.44	2.383	.11	-
	in-groups	2541.87	40	63.54			
	Total	2844.76	42				
Height	Between Groups	101.05	2	50.52	1.619	.21	-
	in-groups	1248.11	40	31.20			
	Total	1349.16	42				
VKİ	Between Groups	88.71	2	44.35	8.767	.00	15-16 y 15-17 y 16-17 y
	in-groups	202.37	40	5.05			
	Total	291.08	42				
Claw right Between	Between Groups	64.70	2	32.31	0.455	0.64	-
	in-groups	2841.57	40	71.03			
	Total	2906.27	42				
Claw left	Between Groups	140.63	2	70.31	1.19	.31	-
	in-groups	2345.82	40	58.64			
	Total	2486.46	42				
Back force	Between Groups	1459.27	2	729.64	2.01	.18	-
	in-groups	14507.79	40	362.69			
	Total	15967.07	42				
Leg force	Between Groups	2646.26	2	1323.13	2.56	.09	-
	in-groups	20618.52	40	515.46			
	Total	23264.79	42				
10m sprint	Between Groups	.198	2	.099	2.32	.11	-
	in-groups	1.70	40	.043			
	Total	1.90	42				
30m sprint	Between Groups	1.013	2	.507	3.91	.03	15-16 y
	in-groups	5.17	40	.129			
	Total	6.18	42				
Percentage of fat	Between Groups	1.77	2	.88	.86	.43	-
	in-groups	40.96	40	1.02			
	Total	42.73	42				
Flexibility	Between Groups	4.90	2	2.45	.136	.87	-
	in-groups	720.71	40	18.01			
	Total	725.62	42				
Anaerobic power	Between Groups	2723.84	2	1361.92	9.76	.00	15-16 y 15-17 y 16-17 y
	in-groups	5578.76	40	139.46			
	Total	8302.60	42				
Shoulder circumference	Between Groups	376.91	2	188.45	6.40	.00	15-16 y 15-17 y 16-17 y
	in-groups	1176.55	40	29.41			
	Total	1553.46	42				
Neck circumference	Between Groups	87.04	2	43.52	.564	.57	-
	in-groups	3085.60	40	77.14			
	Total	3172.65	42				
Chest circumference	Between Groups	363.21	2	181.60	3.31	.04	15-17 y
	in-groups	2194.35	40	54.85			
	Total	2557.57	42				
Waist circumference	Between Groups	47.37	2	23.68	.903	.41	-
	in-groups	1049.32	40	26.23			
	Total	1096.69	42				

Hip circumference	Between Groups	42.74	2	21.37	.697	.51	-
	in-groups	1226.52	40	30.66			
	Total	1269.26	42				
Femur circumference	Between Groups	116.63	2	58.31	2.77	.08	-
	İn-groups	842.05	40	21.05			
	Total	958.68	42				

When Table 1 is examined, there is no significant difference between age variable and height, weight, claw, back, leg strength, 10 m sprint, flexibility, fat percentage, waist, hip, and femur values ($p>0.05$), however, there was a significant difference between the groups in terms of BMI, 30m sprint, anaerobic power, shoulder and chest circumference ($p<0.05$).

4. Discussion

It is expected that regular wrestling exercise is to lead to changes in the physical and motoric characteristics of children of developmental age. In the study, it was observed that there was no significant difference between the age variable of the groups and their height and body weight. Unlike our study, Cicioğlu et al. (2007) found a significant relationship between the age variable and body weight and height. It is observed in Table 1 that there is a significant difference between BMI and age variables between all groups. For age, a positive increase in BMI is observed. Aslan et al. (2013) found that BMI averages of athletes aged 13-15 were 22.1 ± 4.0 kg / m2 and increased with age. Bayraktar et al. (2012) according to the research findings, BMI values increased in parallel with the increase in age. Claw force is important in terms of the wrestling branch. There are parallel and opposite studies in our literature. In the study, no significant difference was found between the right and left paw force and the age variable. Gökdemir et al. (2000) have found positive developments in right and left paw forces as a result of 8 weeks of training in wrestlers aged 16-17, in another study, there were differences between the right and left paw forces of the wrestlers in parallel with exercise training, in another study, he suggested that different sports training caused changes in claw force (Ziyagil et al., 1996; Alıcı & İri, 2015). It was determined that there was no significant difference between the groups in terms of back and leg strength values.Aydos et al. (2004) found the back force average of individuals who received wrestling training as 94.9 ± 21.44 kg, In another study, it was found that there were significant differences in the back and leg strength between the groups with and without sports training (Polat et al., 2009). Strength training has positive effects on back and leg strength. The absence of significant differences between the groups according to the age variable may be an indication of insufficient strength training. In the study, it was found that there was no significant difference between the age variable and 10 m sprint, but there was a significant difference in the performance of the 30 m sprint between the 15-16 age group. When the literature had analyzed, it has been determined that exercise training that is carried out regularly for 12 weeks does not cause any change in sprint performance in the wrestling branch. It was thought that this difference between the groups is due to the increase in sprint ability with age. No statistically significant difference was observed between the age variable and fat percentage and flexibility values. When the literature had analyzed, Aslan et al. (2013) reported that the percentage of fats of the wrestlers in the age range of 13-15 is 12.1 ± 6.1%, in another study, the average of fat percentage of wrestlers with the average age of 16 is 6.71 ± 1.32 (Ziyagil et al., 1996). Bayraktar et al., (2012) values are decreasing in parallel with the increase in age except for 13 years and it is observed that it increases after 17 years of age. Flexibility is of great importance in wrestling while applying techniques, high flexibility contributes to making the movement perfect.According to Petrow, the best flexibility can be developed between the ages of 12-14 (Petrow, 1987). In this age group, flexibility is expected to have similar characteristics, and our study supported this. In the study, significant differences were observed in all age groups in terms of anaerobic power performance.Anaerobic power and capacity; performance determining criteria for high intensity or maximal exercises in a short time. It has been determined that anaerobic power is related to age, body weight and most importantly lean body mass, body weight positively affects the strength and anaerobic power. Kürkçü et al. (2009) determined the anaerobic power levels of children 12-13 years of age wrestling training as 107.79 ± 11.68 (kg/m/sec). Cicioğlu et al. (2007) determined that the pre-season and post-season changes of the wrestlers in the 15-17 age group were in the range of 102.26 ± 13.57 to 117.94 ± 13.84 kgm/sec, respectively. It has been determined that wrestlers' lean body masses and body fat percentages are effective in anaerobic performance and leg and back strength (Şenel et al., 2009). Muscle strength, muscular endurance, and anaerobic capacity are the most important variables in individuals who received Greco-Roman wrestling training and it is important to develop these variables to be successful (Nikooie et al., 2017). In a study of wrestlers, some variables such as body weight, leg-arm muscle mass were found to play a role in anaerobic performance values taken from the

lower extremities (Erkılıç & Şenel, 2019). In our study, it was found that there was no significant relationship between the age variable and the circumference of the neck, waist, hip, and femur. While there was a significant difference between the groups in all age categories around the shoulder, there was only a significant difference in the chest area between the ages of 15-17. Our study, Cicioğlu et al. (2007) Measurements carried out environmentally by 15-17 age star national team athletes have parallel results. In another study of anaerobic power; biceps, chest, thigh and abdominal circumference, wrist, elbow, knee and trochanter diameters, shoulder width, sitting height, handgrip strength, and fat percentage were found significantly related (Ağaoğlu et al., 2001). Overall, to achieve high-level wrestling performance, training should be directed to develop anaerobic power and capacity, aerobic power, maximal dynamic and isometric strength, explosive strength, and strength endurance.

Wrestling education taken in order to achieve high efficiency should be towards developing anaerobic power and capacity, aerobic power, maximum dynamic, and isometric power, explosive power, flexibility, and endurance. (Helmi et al., 2017).

5. Conclusion

As a result, individuals with wrestling training throughout the season are expected to increase their physical and motoric performance. Growth in the age range of 15-17 is very fast in certain parameters and changes can be observed in a short time. Undoubtedly, exercise education in the age of growth has positive effects on the development of children. In the light of the information obtained in our study, regular wrestling training was found to have positive effects on BMI, 30 m sprint, anaerobic power, and some environmental measurements. In future studies, the study can be developed by considering different exercise education, age, and gender.

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