THE EVALUATION OF SOME PHYSICAL AND MOTOR FEATURES OF THE FEMALE AND MALE STUDENTS AGED 12–14 WHO PARTICIPATED IN SPORTS OR NOT

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Abstract: *This study was applied to total 53 students aged 12-14, who participated in sports regularly in their school or club teams or not, from three different public schools in the city center of Kastamonu. The mean age of 15 female students participating in sports was 13,20±0,77 and the mean age of 11 male students participating in sports was 13±0,90, and also the mean age of 15 female students not participating in sports was 13,20±0,78 and the mean age of 12 male students not participating in sports was 13,08±0,80. The subjects were chosen randomly and the tests and measures were performed in the gymnasium. In order to determine the features of subjects, their height and weight were measured, some tests were performed by using Eurofit test battery and also Illinois agility test were applied.*
Data were analyzed in SPSS 16.0 statistical package program and in order to compare the averages of groups with regard to some variables Mann-Whitney U Test was used. The level of significance was accepted as p< 0,05.
At the end of the study, it was determined that when compared the values of the female subjects participating in sports and the ones not participating in sports, significant differences were found in body fat percent, 10x5 m. sprint, right and left hand reaction to light, standing long jump, flamingo balance, sit and reach flexibility and anaerobic power tests (p<0,05), there were no significant difference in right and left hand grip strength, Illinois agility test values. It was also seen that when compared the values of the male subjects participating in sports and the ones not participating in sports, there were significant differences in 10x5 m. sprint, right and left hand reaction to light, standing long jump, flamingo balance, sit and reach flexibility tests (p<0,05), no significant difference was found in body fat percent, right and left hand grip strength, anaerobic power and Illinois agility tests.

Key words: *12-14 aged, Physical Features, Motor Features.*

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1. Introduction

In terms of the healthy society of future, it will be a great investment to have children gain an active lifestyle from an early age (Özer and Özer, 2004). Sports is important not only for healthy development but also for personality development and mental health. Principally, the main aim of the child's participating in sports must have them increase the cardiovascular endurance, improve the neuromuscular coordination, strength and flexibility. These features should be gained to the preschool and primary school children with the activities in accord with pedagogical approach on the basis of game forms (Mengütay, 2005).

2. Purpose

This study was performed with the aim of the evaluation of some physical and motor features of the female and male students aged 12–14 who participated in sports or not.

3. Research Methods

The study was applied to total 53 students aged 12-14, who were volleyball players in their school or club teams or not, from three different public schools in the city center of Kastamonu. The mean age of 15 female students participating in sports was 13,20±0,77 and the mean age of 11 male students participating in sports was 13±0,90, and also the mean age of 15 female students not participating in sports was 13,20±0,78 and the mean age of 12 male students not participating in sports was 13,08±0,80. The subjects were chosen randomly and the tests and measures were performed in the gymnasium. In order to determine the features of subjects, their height and weight were measured, some tests were performed by using Eurofit test battery and also Illinois agility test were applied.

3.1. Measurement Methods: Weight and Height Measurement Body Fat Percent Measurement

Five skinfolds (biceps, triceps, subscapular, supra-iliac and leg) were measured on the right side of the body. Body fat was calculated using Sloan ve Weir's Formula.

For male;

Body density (gm/ml) = 1.1043-0.00133 (leg SF) – 0.00131(subscapular SF)

Percent Body Fat Measurement = (4.57/density-4.142)100

SE = 0.0082

For female;

Body density (gm/ml)=1.0764- 0.00081 (suprailiac SF)- 0.00088 (triceps SF)

Percent Body Fat Measurement = (4.57/density-4.142)100

SE=0.0082

SE=Standart Deviation

SF=Underskin Fat Measurement (Günay et al., 2006; Kamar, 2003)

10 x 5 m Shuttle Test Measurement: Marker cones and/or lines were placed five meters apart. Start with a foot at one marker. When instructed by the timer, the subject run to the opposite marker, turned and returned to the starting line. This was repeated five times without stopping (covering 50 meters total). At each marker both feet must fully cross the line (Şıpal, 1989; Kamar, 2003).

Reaction Time Measurement: "Power 2000 Newtest" branded multiple choice reaction time measure was used for evaluating the reaction times of the subjects to the light. Every test was performed three times and the best value vas recorded (Günay et al., 2006).

Hand Grip Strength Measurement: With adjustable handle dynamometer from dominant hands and recorded as kilograms (Kamar, 2003; Şıpal, 1989; Günay et al., 2006).

Standing Long Jump Test (Broad Jump): The athlete stood behind a line marked on the ground with feet slightly apart. A two foot take-off and landing were used, with swinging of the arms and bending of the knees to provide forward drive. The subject attempted to jump as far as possible, landing on both feet without falling backwards. The better of two attempts was recorded in centimeters (Kamar, 2003; Şıpal, 1989).

Flamingo Balance Test: Metal beam 50 cm long, 5 cm high and 3 cm wide (the beam was stabilized by two supports at each end, and should have a non-slip surface) the subjects stood on the beam. They tried to keep balance. While balancing on the preferred leg, the free leg was flexed at the knee and the foot of this leg held close to the buttocks. The measurement was performed by calculating of the subject's number of attempts in a minute (Kamar, 2003; Şıpal, 1989).

Sit And Reach Flexibility Test: The test was performed twice and the better one was recorded (Kamar, 2003; Şıpal, 1989).

Vertical Jumping and Anaerobic Power Measurement: It was performed by using vertical jump tester. The anaerobic power of the subjects was calculated with the formula below.

P = ($\sqrt{4.9}$ x W x $\sqrt{D_n}$)

P = Anaerobic Power

D = Vertical Jumping Distance (m) (Günay et al., 2006)

Illinois Agility Test: The length of the course was 10 meters and the width (distance between the start and finish points) was 5 meters. Four cones were used to mark the start, finish and the two turning points. Another four cones were placed down the center an equal distance apart. Each cone in the center was spaced 3.3 meters apart. Subjects should start lying face downwith the hands at shoulder level. On the "Go" command, the athletes began, the stopwatch was started, and the athletes got up and run the course in the direction indicated, without knocking the cones over, trial was completed when they crossed the finish line (Miller et al., 2006).

4. Statistical Analysis

Data were analyzed in SPSS 16.0 statistical package program and in order to compare the averages of groups with regard to some variables Mann-Whitney U Test was used. The level of significance was accepted as p< 0,05.

5. Results

It was concluded that the mean weight of female subjects participating in sports was 47,53±10,74 kg., the mean weight of female subjects not participating in sports was 52,27±7,34 kg., and also the mean weight of male subjects participating in sports was 43,64±10,43 kg., the mean weight of male subjects not participating in sports was 52,17±12,18 kg. It was also determined that the mean height of female subjects participating in sports was 156,73±7,81 cm., the mean height of female subjects not participating in sports was 156,02±6,78 cm., and the mean height of male subjects participating in sports was 151,73±9,34 cm., the mean height of male subjects not participating in sports was 156,01±8,58 cm.

It was concluded that there were significant differences in body fat percent, 10x5 m. sprint, right and left hand reaction to light, standing long jump, flamingo balance, sit and reach flexibility and anaerobic power test values of the female subjects (p<0,05), there was no significant difference in right and left hang grip strength, Illinois agility test values (p>0,05).

At the same time, it was understood that the significant differences were found in

10x5 m. sprint, right and left hand reaction to light, standing long jump, flamingo balance, sit and reach flexibility test values of male subjects (p<0,05), but there was no significant difference in body fat percent, right and left hand grip strength, anaerobic power and Illinois agility test values (p>0,05).

6. Conclusions

In this study, the mean age of female subjects (n=15) participating in sports was 13,20±0,77 and the mean age of female subjects (n=15) not participating in sports was 13,20±0,78, and also the mean age of male subjects (n=11) participating in sports was 13±0,90 and the mean age of male subjects (n=12) not participating in sports was 13,08±0,80.

At the end of the measurements, it was found that the mean weight of females' values were 47,53±10,74 kg for the ones participating in sports and 52,27±7,34 kg. for the ones not participating in sports, and also the mean weight of males' values were 43,64±10,43 kg. for the ones participating in sports and 52,17±12,18 kg. for the ones not participating in sports. At the same time it was seen that the mean height of females' values were 156,73±7,81 cm. for the ones participating in sports and 156,02±6,78 cm. for the ones not participating in sports, and also the mean height of males' values were 151,73±9,34 cm. for the ones participating in sports and 156,01±8,58 cm. for the ones not participating in sports. The results of our study have showed similarities with the results of study conducted on handball and volleyball players by Koç and Aslan (2010) and the study performed on the male students from same age group by Kürkçü and friend (2001).

In our study, it was found that the weight and height averages of females were higher than the values of males. The females

between 12-14 age tend to be heavier than males. An increase at the rate of ¼ in their muscle mass is observed and also this enables adolescent to be ready for sportive activities and intensive training. Since the females reach puberty taller than males, they are taller than males. The males reach the females' height about 14 age and they surpass the females (Özer and Özer, 2004).

When compared the body fat percent, there was a significant difference in the values of females (p<0.05), but not for the values of males (p>0.05). In the study, body fat percent was found 18,51±3,48 for the females participating in sports, 21,25±2,81 for the females not participating in sports and also 12,42±4,22 for the males participating in sports, 16,45±6,90 for the males not participating in sports. The values of females' body fat percent were higher than the values of males. While the underskin layer of fat of the extremities has decreased for the males in puberty, it has continued to increase for females (Özer and Özer, 2004). The physically active children has lower body fat percent in comparison with the passive children (Muratlı, 2007).

In the studies performed on the children aged 12-14 aged, it was found that the females' values of the underskin layer of fat were higher than the values of males (Boreham et al., 2001).

In comparison of 10x5 m. sprint values, it was seen that there were significant differences (p<0.05). It was determined that the values of 10x5 m. sprint were 21,90±1,63 sec. for the females participating in sports and 24,75±1,38 sec. for the females not participating in sports. It was also found that the values of 10x5 m. sprint were 21,94±0,97 sec. for the males participating in sports and 24,20±1,62 sec. for the males not participating in sports.

There is no important difference in age of 11-12. The males reach their maximum

speed in 12, The girls also reach it in 14. Nevertheless, the difference at a rate of % 5-10 has been seen after puberty (Günay and Yüce, 2008).

In comparison of right and left hand reaction to light values, it was also determined that there were significant differences (p<0.05).

The ability of reaction has showed increase from the age of 16. The differences peculiar to gender have also become apparent from the age of 14. The children participating any of the sport branches have above the average ability of reaction (Mengütay, 2005).

In our study, it was found that the right hand grip strength was 23,67±5,33 kg., the left hand grip strength was 22,61±4,84 kg. for the females participating in sports, the right hand grip strength was 22,48±4,36 kg., the left hand grip strength was 21,55±3,06 kg. for the females not participating in sports and the right hand grip strength was 24,00±6,03 kg., the left hand grip strength was 21,40±4,28 kg. for the males participating in sports, the right hand grip strength was 22,28±4,68 kg., the left hand grip strength was 20,91±2,76 kg. for the males not participating in sports. In evaluation of the subjects' right and left hand grip strength, no significant difference was found (p>0.05). The results of our study have showed similarities with the study performed on the same age group by Kürkçü et al (2001).

In the first period of puberty, more or less discordance varying from person to person has been seen among the body parts in consequence of faster increase in length. It has also caused some problematic changes for the leverages in body since the muscular system couldn't catch up with skeletal system. Because of the negative weight-strength rate in the leverage systems of body, the child has been in the most inefficient period in terms of strength production (Günay et al., 2006).

In evaluation of standing long jump test values, it was concluded that there were significant differences (p<0,05). In the study performed on female basketball players 14-16 aged by Pense et al. (2010), there was also a significant difference in the values of standing long jump. It was observed that the athletes could jump further than the sedentary ones.

In comparison of flamingo balance test values, it was observed that there were significant differences (p<0.05). In the study, balance test values were found 2,20±1,52 for the females participating in sports, 7,27±4,57 for the females not participating in sports, 2,82±1,72 for the males participating in sports and 6,75±4,37 for the males not participating in sports.

Balance is a very important factor in gaining some skills such as walking, running and jumping (Özer and Özer, 2004). The ability of balance has either slackened or improved merely with the beginning of puberty. The performance levels of children training regularly has been seen more higher. Nevertheless, the path of success development has showed the same tendencies with the children not training (Muratlı, 2007).

In evaluation of the flexibility values of males and females, it was seen that there were significant differences (p<0.05). It can be said for the reason that flexibility has developed better in this period. In the study, it was found that the flexibility values were 29,50±4,63 cm. for the females participating in sports, 18,30±5,07 cm. for the females not participating in sports, 27,14±4,65 cm. for the males participating in sports and 15,67±4,70 cm. for the males not participating in sports. The results of our study have showed similarities with the studies performed on the male students by Aydos et al. (1997) and Kürkçü et al (2001). In addition to these, in the study performed on female

basketball players 14-16 aged by Pense et al. (2010), it was found that there was also a significant difference in the values of flexibility.

In the subject of flexibility as a motor feature, females have more advantages than males. While this difference has still come into focus in the period of puberty, the development of females has come to a head in the age of 14 (Muratlı, 2007).

In evaluation of anaerobic power, as there was a significant difference in the values of females ($p<0.05$), no significant difference was found in the values of males ($p>0.05$).

In comparison of Illinois agility test, there was no significant difference in the values of females and males ($p>0.05$). In the study, it was seen that the values of Illinois agility test were 19,77±0,88 sec.

for the females participating in sports, 23,12±1,15 sec. for the females not participating in sports, 19,82±1,30 sec. for the males participating in sports and 20,90±1,10 sec. for the males not participating in sports. These results have showed similarities with the study conducted on male basketball players by Kızılet et al (2010).

As a result of the factors dependent on the fast growth of body parts, some problems such as inadequecy in coordinative skills, disorder of movement harmony has occured. The agility is the most affected motor feature from these matters. It can be seen the difficulties in learning of movement and temporary decrease in performance with regard to these cases for the children aged 11-13 (Muratlı, 2007).

The Basic Physical Features of Male and Female Subjects Table 1

Variables	Groups		Average
Age (year)	Athlete	Female	13,20±0,77
		Male	13±0,90
	Sedentary	Female	13,20±0,78
		Male	13,08±0,80
Height Measurement (cm)	Athlete	Female	156,73±7,81
		Male	151,73±9,34
	Sedentary	Female	156,02±6,78
		Male	156,01±8,58
Weight Measurement (kg)	Athlete	Female	47,53±10,74
		Male	43,64±10,43
	Sedentary	Female	52,27±7,34
		Male	52,17±12,18

The Measurement Results of Female Subjects Table 2

Variables	Groups	N	X± Std. D.	Mean Rank	Sum of Rank	p
Body Fat Percent (%)	Athlete	15	18,51±3,48	10,40	156,00	0,001*
	Sedentary	15	21,25±2,81	20,60	309,00	
10 x 5 m. (sec)	Athlete	15	21,90±1,63	9,27	139,00	0,000*
	Sedentary	15	24,75±1,38	21,73	326,00	
Right Hand Reaction Time To Light (msn)	Athlete	15	230,87±24,91	9,60	144,00	0,000*
	Sedentary	15	274,27±28,40	21,40	321,00	
Left Hand Reaction Time To Light (msn)	Athlete	15	230,67±12,15	9,60	144,00	0,003*
	Sedentary	15	272,13±30,85	21,40	321,00	
Right Hand Grip Strength (kg)	Athlete	15	23,67±5,33	16,53	248,00	0,520
	Sedentary	15	22,61±4,84	14,47	217,00	
Left Hand Grip Strength (kg)	Athlete	15	22,48±4,36	16,10	241,50	0,709
	Sedentary	15	21,55±3,06	14,90	223,50	
Standing Long Jump Test (cm)	Athlete	15	155,80±19,06	20,20	303,00	0,000*
	Sedentary	15	130,87±19,18	10,80	162,00	
Flamingo Balance Test (min)	Athlete	15	2,20±1,52	10,40	156,00	0,015*
	Sedentary	15	7,27±4,57	20,60	309,00	
Sit and Reach Flexibility Test (cm)	Athlete	15	29,50±4,63	22,13	332,00	0,000*
	Sedentary	15	18,30±5,07	8,87	133,00	
Anaerobic Power (kg.m/min)	Athlete	15	59,06±15,30	15,67	235,00	0,000*
	Sedentary	15	58,20±10,30	15,33	230,00	
Illinois Agility Test (sec)	Athlete	15	19,77±0,88	8,00	120,00	0,917
	Sedentary	15	23,12±1,15	23,00	345,00	

*p<0.05

The Measurement Results of Male Subjects Table 3

Variables	Groups	N	X± Std. D.	Mean Rank	Sum of Rank	p
Body Fat Percent (%)	Athlete	11	12,42±4,22	9,73	107,00	0,124
	Sedentary	12	16,45±6,90	14,08	169,00	
10 x 5 m. (sec)	Athlete	11	21,94±0,97	7,36	81,00	0,002*
	Sedentary	12	24,20±1,62	16,25	195,00	
Right Hand Reaction Time To Light (msn)	Athlete	11	235,27±25,24	9,09	100,00	0,049*
	Sedentary	12	264,75±31,30	14,67	176,00	
Left Hand Reaction Time To Light (msn)	Athlete	11	226,64±26,93	8,50	93,50	0,018*
	Sedentary	12	248,33±14,46	15,21	182,50	
Right Hand Grip Strength (kg)	Athlete	11	24,00±6,03	13,09	144,00	0,460
	Sedentary	12	21,40±4,28	11,00	132,00	
Left Hand Grip Strength (kg)	Athlete	11	22,28±4,68	13,00	143,00	0,498
	Sedentary	12	20,91±2,76	11,08	133,00	
Standing Long Jump Test (cm)	Athlete	11	161,91±15,88	15,36	169,00	0,022*
	Sedentary	12	135,51±30,60	8,92	107,00	
Flamingo Balance Test (min)	Athlete	11	2,82±1,72	8,91	98,00	0,034*
	Sedentary	12	6,75±4,37	14,83	178,00	
Sit and Reach Flexibility Test (cm)	Athlete	11	27,14±4,65	17,59	193,50	0,000*
	Sedentary	12	15,67±4,70	6,88	82,50	
Anaerobic Power (kg.m/min)	Athlete	11	55,03±12,22	11,27	124,00	0,622
	Sedentary	12	57,01±13,13	12,67	152,00	
Illinois Agility Test (sec)	Athlete	11	19,82±1,30	9,18	101,00	0,056
	Sedentary	12	20,90±1,10	14,58	175,00	

*p<0.05

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