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Original article

COMPARISON OF FLEXIBILITY AND SPEED CHARACTERISTICS OF THE 11-14 AGE CHILDREN WHO DO NOT ACTIVELY PARTICIPATED IN SPORTS

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Abstract

Purpose. The purpose of this study was to compare some biometric characteristics of the 11-14 age children who do not actively participated in sports.

Methods. 280 boys and 221 girls (Boys; age: 12,8 years, height: 158,1 cm, weight: 50,2 kg and Girls; age: 12,7 years, height: 155,6 cm, weight: 48,7 kg) volunteered to participate in this study. Flexibility and speed of the children were measured. Independent sample t test was used to, flexibility and of the boys and girls. One way ANOVA was conducted to evaluate the effects of age groups.

Results. Test results show that flexibility and speed of the girls significantly higher than boys ($p < 0,05$).

Conclusions. There were significant differences found for flexibility and speed between age groups ($p < 0,05$).

Keywords: Flexibility, Speed, Age, Gender.

Introduction

One of the indicators of physical strength that can be made an appearance by humankind himself is speed feature. Speed in terms of sports requiring explosive strength is determiner of performance. (Açıkada, Ergen, 1990) Speed performance is highly dependent on the relative muscle strength. Speed is a performance set forth result of the motoric activities. It is also indicative of anaerobic muscle metabolism. Nearly all the muscles of the body work to improve speed in the circumstances which are short distances at maximal intensity. Meanwhile, respiratory muscles do more work in order to meet the increased pulmonary function (Günay, 1998). Different components of the speed depend on level of coordination and produced muscle strength. Development of the strength always causes the increase of moving speed (Açıkada, Ergen, 1990). Speed can also show different developmental characteristics according to different age groups. In the preschool period, movements occur slowly and they are general ones. But between 5-7 ages, an improvement is seen in the general movement speed. In the primary school children period (between 6-9 ages) development of movement speed makes the biggest progress. In the secondary school children period (between 10-14 ages) speed of reaction reaches almost adult values. Movement speed also shows continuous increase. In the first and second adolescence period (between 14-18 ages), speed characteristics

which are connected to mobility of neural processes reach maximum values and completes the development (Muratlı, 1997). Tabatschink, speed ability in many sports determining the efficiency is an important motoric feature. Neurophysiological factors belonging to speed have been quite determined in a genetic way, in other words, they have a qualification bearing a limited variability. Flexibility defined as maximal capacity to move a joint during the specific movement is a required and important factor for physical performance (Ersöz, Gürsel, Gündüz, Sunay, Müniroğlu, Oygulu, Balcı, Eroğlu, 1994). For this reason, flexibility is not only in sports competitions for success, but also it is essential in terms of protection from injuries (Doğan, Zorba, 1991). Flexibility can be defines in different ways. The main definition of flexibility is described as optimal mobility enabled by connective and muscular tissue. Because it includes not only quantity of flexibility, but also distance and angular degrees of optimal motion width (Zorba, 1999). In some conducted studies; to determine the importance of flexibility in terms of physical suitability, 6 fitness test was applied to 6 children from American kids and positive effects of flexibility of 44 % rate on other fitness tests were found (Zorba, 1999). Some studies have been revealed that ages 11-14 are the most suitable age in order to improve the flexibility of spine, shoulder circle, hip joint. Thus, the last development stage of flexibility that can be practiced

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in a provable way is the secondary school children period. After that, however, it is only possible to maintain the level reached (Doyle, 1998). Human's basic biometric characteristics are the sum of a person's body power, ability and the complex nature. Strength is the ability of performing the movements as speed, strength, mobility, flexibility and coordination. They can be changeable according to the degree of adaptability and efficiency. These feature are in essence and can not be learned, but can be improved in several studies (Sevim, 1995). It has been seen that children's flexibility and speed characteristics can help them to participate in sports branches based on information in the literature. In the light of these information, the aim of this study is to compare the flexibility and speed characteristics of sedentary children between 11-14 years old according to age and sex.

Methods. Research Group: 280 boy and 221 girl between the ages of 11-14 who do not sport (for men age:12.8 years, height:158.1 cm, weight: 50.2 kg; Ladies' age:12.7 years, height:155,6 cm, weight: 48.7kg) participated voluntarily in the study. **Physical tests applied to an athlete:** Sit and reach test for flexibility; box meeting the Eurofit test battery and criteria, 35 cm length, 45 cm width, and sit-lie tool, top surface 55 cm long, 45 cm wide and 15 cm from the front where the feet are leaned, were used. The subject is seated on flat surface in a tight position without bending during the implementation of flexibility test. His arms in a tight way is requested to push the flexibility measurement board to a point as far as the subject can reach. Each test measurement was made 3 times and 30 seconds break was given between the each attempt. The highest value of 3 measurements was recorded as the measurement results. Casio HS-30W-

1W stopwatch was used to determine the speed strength. Speed test was carried out in a gym with hardwood floors.

To perform the test, start and finish points were marked with 2 colourful funnels. The best way to run 20 m distance was provided to the subject in the horizontal starting position with the whistle command. Each test measurement was performed 3 times and 2 minutes break was given between the each attempt. The highest value of 3 measurements was recorded as the measurement results.

Data analysis: Descriptive statistics belonging to all variables were calculated as arithmetic mean () and standard deviation (SD) and showed in the table like (X ± SS). In order to determine whether the difference between age variable according to flexibility and speed characteristics is meaningful or not at the level of $\alpha=0.05$ one-way ANOVA test was performed. When the difference was found in the result of variance analysis, Tukey test was performed in order to determine the difference from which age group resulted. In order to determine the difference between flexibility and speed skills of the subjects participated in the study is meaningful or not according to gender, t test was used in the independent groups; according to the age variable one-way ANOVA test was used.

All statistical procedures were performed in the statistical software package SPSS 20 for Windows and the error level of $p<0,05$ was used.

Findings. Physical characteristics of the subject participating in the study were shown in the table 1. The average age of men 12.8 years, mean height 158.1 cm, mean weight 50.2 kg, the average age of women 12.7 years, mean height 155.6 cm, mean weight was 48.7 kg, respectively (see table 1).

Variables	Gender	N	X	±	SS
Age	Boy	280	12,8		1,02
	Girl	221	12,7		1,01
Height	Boy	280	158,1		9,6
	Girl	221	155,6		7,6
Weight	Boy	280	50,2		12,3
	Girl	221	48,7		12,1

Table 1:Physical characteristics of the subjects participating in the study.

T test was performed at the level of $\alpha=0.05$ in order to determine whether the difference between the values of flexibility and speed skills of men and women participating the study was significant.

Table 2: According to the gender of the subjects participating in the study flexibility and speed characteristics.

Variables	Gender	N	X ±	S.S.	t
Flexibility	Boy	280	17,38	6,68	-4,351*
	Girl	221	20,004		
Speed	Boy	280	4,28	0,48	-10,647*
	Girl	221	4,82	0,63	

P<0,05*

The test result of girls who participated in the study skills, flexibility and speed values significantly higher than those of boys have been observed (P <0.05).

Table 3: flexibility and speed characteristics according to the age of the subjects participating in the study.

Variables	Gender	Mean	SS	F
Flexibility	11	18,69	6,85	2.700*
	12	16,70	6,72	
	13	18,27	6,77	
	14	20,14	6,59	
Speed	11	4,34	0,25	7,256*
	12	4,57	0,35	
	13	4,61	0,68	
	14	4,37	0,60	

P<0,05*

The test result of the subjects participating in the study of the flexibility and speed skills levels showed a significant difference (p <0.05). Tukey test result, 12 of the distance values of the age group of 14 years from the group of flexibility, the flexibility of the age group from 13 to 14 fatty group value was found to be significantly higher. 11 age group, the value of the speed of skills between the ages of 12 and 13, 14 of the age group between the ages of 12 and 13 speed skill values were found to be significantly higher (p <0.05).

Discussion. The students studying in primary school in the province of Kütahya; 280 boys and 221 girls who do not exercise participated in this study; the average height of the male students (158.1 ± 9.6 cm), the average body weight (50.2 ± 12.3 kg), the average elasticity (17.38 ± 6.68 cm), the average speed (4.28 ± 0.48 sec.) and the average height of girls (155.6 ± 7.6 cm), the average body weight (48.7 ± 12.1 kg), the average flexibility (20.004 ± 6.7cm.) the average speed (4.82 ± 0.63 sec.) have been determined.

Examined according to gender; while boys' height and speed values were noticeably higher; the distance values of flexibility for female students were

significantly higher than male students (p <0.05), there was no significant difference between the two groups in body weight. When analysed according age A significant difference was found between the values: flexibility within subjects (F = 2.70, 2.700, P <0.05), speed rate (F = 7.256, P <0.05). TUKEY test was used as a second test to identify which group differences that result from in terms of flexibility distance and speed rate. According to the test results, it was identified that the flexibility of distance rates in the age group of 12 were significantly higher than in the age group of 14 and the flexibility of distance rates were in the age group of 13 significantly higher than in the age group of 14.; the rates of speed skills of 11 age group were significantly higher than that of 12-13 age groups and the rates of speed skills of 14 age group were significantly higher than that of 12-12 age groups. (p<0,05). It was found that the average distance of the flexibility of girl students (32.11 ± 3.05 cm) was more than the average elasticity of boy (29.45 ± 4.92 cm) in the study conducted by Tinazcı C.¹⁰ (T.05; 1.49 P <0.05). In the same study, boy sprint speed rates (23.88 ± 2.45) were found higher than that of girls sprint speed rates (25.52 ± 3.38). This research shows parallelism with our research. Because it was observed



that there is not a significant difference between values and the reason of this is comparison of 11 years old girls and boys. It was found that the average rates of flexibility of girls ($16,67 \pm 5,30$ cm) are higher than that of boys ($8,41 \pm 5,40$ cm) in the study conducted by Gürsoy R.¹¹ ($p < 0,05$). This conducted study shows parallelism with our research. It was found that the average speed of boys ($3,309 \pm 0,1651$ sec.) were higher than that of girls ($4,055 \pm 0,3066$ sec.) in the study conducted by Yüksel O. and et al.¹² ($t.05$; $1,816$; $P < 0,01$). In the same study conducted by them, it was found that the average flexibility of girls ($18,875 \pm 0,1651$ sec.) were higher than that of boys ($15,944 \pm 6,0335$ cm) and significant difference was found between the rates ($t.05$; $2,761$, $P < 0,05$). This study supports the one that conducted by us. It was found that average speed of boys ($3,94 \pm 0,31$ sec.) were higher than that of girls ($4,31 \pm 0,28$ sec.) in the study conducted by Kalkavan A. and et al.¹³ and there was a significant difference between them. ($F=15,132$; $P < 0,00$). In the same study there was a significant difference in the distance of flexibility between the rates of girls and boys. ($F=3,867$; $P < 0,05$). These studies conducted by them supports our one.⁽¹³⁾. M. Günay and et al. have found in the study they carried out that girl students have more flexibility averages ($18,30 \pm 5,07$) than the flexibility averages of the male students ($15,67 \pm 4,70$). They have found a remarkable difference between the values ($p < 0,05$)⁽¹⁴⁾. H. Yorulmaz has found in the study he carried out that the speed averages of the men ($7,64 \pm 0,32$ sec.) are more than the speed averages of the women ($9,45 \pm 0,45$ sn). A significant difference has been observed between the values. A.E. Pekel and et al. have found in the study they carried out that the speed averages of the men ($5,03 \pm 0,26$ sec.) are more than the speed averages of women ($5,24 \pm 0,35$ sec.) and there is a significant difference between the values. ($t.05$; $-3,22$; $P < 0,001$). They In the same study, they have found that the flexibility averages of the women ($25,04 \pm 5,01$ cm) are more than the flexibility averages of the men ($21,03 \pm 6,0$) and there is an important difference between the values ($t.05$; $-3,59$; $P < 0,01$). Güler D. and et al. have found in the study they carried out that in the measurement of flexibility values, the eight age group is ($22,42 \pm 4,91$), ninth age group is ($22,35 \pm 5,31$) but tenth age group is ($22,71 \pm 5,19$) and they have failed to find a remarkable difference between the values.

This study doesn't support our work. This is because levels of development of children aged between 8 and 10 are believed to be close to each other. CJ Jones et al.

have found in the study they carried out that the flexibility averages of the women are ($24,31 \pm 11,57$ cm.), the flexibility averages of the men are ($20,84 \pm 12,81$ cm.) and there is a significant difference between the values ($t.05$; $5,48$; $P < 0,01$).

Erden S. et al. have found in the study they carried out that the flexibility distances of the women ($19,11 \pm 4,86$ cm.) are more than the flexibility averages of the men ($18,14 \pm 5,01$); ($P < 0,01$). In the same study, the average speeds of men ($4,33 \pm 0,15$ cm.) are more than the average speed of the girls ($4,99 \pm 0,22$ cm.); ($P < 0,05$). This study doesn't support our work. Agaoglu S.A et al. have found in the study they carried out that the flexibility averages of the age group of 13 and 14 ($26,19 \pm 5,29$ cm.) are higher than the averages of the age group of 11 and 12 ($23,89 \pm 4,83$ cm.), but they have failed to find a remarkable difference ($P=0,094$; $0,05$). This study doesn't support our work. In the same study the speed rates of the age group of 13 and 14 ($5,41 \pm 0,29$ sn.) are higher than the rates of the age group of 11 and 12 ($5,41 \pm 0,29$ sn.) and there is a remarkable difference between the values ($P=0,003$; $P < 0,05$).

Conclusions. This study doesn't support our work because the measurement values of the age groups of 11-12 and 13-14 were analyzed together. R. Arabacı et al. have found in the study they carried out that in the flexibility averages age group of 7-8 is (6,1 cm), age group of 11-12 is (4,5 cm) and there is a significant difference between the values ($F=2,190$; $P < 0,05$). This study doesn't support our work.

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