

AN ANALYSIS OF SOME ANTHROPOMETRIC AND PHYSICAL
PARAMETERS OF CHILDREN RELATED TO AGE ¹

ÇOCUKLARIN BAZI ANTROPOMETRİK VE FİZİKSEL PARAMETRELERE AİT DEĞERLERİNİN YAŞLARA GÖRE İNCELENMESİ

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Öz: Amaç: Bu çalışmanın amacını 4-13 yaş aralığındaki spor yapan çocukların bazı antropometrik ve fiziksel parametrelerinin yaş ve cinsiyete göre incelenmesi oluşturmaktadır. **Yöntem:** Araştırma grubunu Ankara ilinde ilköğretim okullarına ve özel spor merkezlerine devam eden 4-13 yaş aralığında, 200 kız ve 429 erkek olmak üzere, toplam 629 spor yapan çocuktan oluşmaktadır. Araştırma grubuna sırasıyla, bazı antropometrik ölçümler ve kavrama kuvveti, esneklik, dikey sıçrama, durarak uzun atlama, durarak sağlık topu atışı, 10m-20m. sürat koşusu ve çabukluk testleri uygulanmıştır. Antropometrik ve Fiziksel parametrelere ait verilerin ortalama ve standart sapma değerleri bulunmuştur. **Bulgular:** Araştırma grubuna uygulanan durarak uzun atlama, el pençe, dikey sıçrama ve sağlık topu atma kuvvet testlerinde bazı yaş grupları dışında erkeklerin kızlardan daha yüksek değerlere sahip olduğu görülmektedir. Esneklik değerlerine göre 6 yaşına kadar yakın değerler gözlenirken, bu yaştan itibaren kız çocukların daha yüksek esneklik değerlerine sahip olduğu belirlenmiştir. Sürat yetileri incelendiğinde birçok yaş grubunda erkek çocukların daha düşük sürat değerlerine sahip olduğu belirlenmiştir. Çabukluk yetisinde ise bütün yaş gruplarında erkek çocukların daha düşük sürelelere sahip olduğu belirlenmiştir. Elde edilen bulgulara göre 4-13 yaş grubu çocukların antropometrik özelliklerinin fiziksel gelişimine bağlı olarak artış gösterdiği söylenebilir. Motorik özellikler incelendiğinde yaş gelişime bağlı olarak 10 yaşına kadar erkek ve kızların gelişimlerinin benzer olduğu görülmektedir. Ancak kas yapısına bağlı olarak erkeklerin kuvvet, sürat ve çabukluk gerektiren alanlarda 10 yaşından sonra kızlara göre daha fazla gelişim gösterdiğini söylenebilir. **Sonuç:** Sonuç olarak bazı parametrelerin yaşa ve cinsiyete bağlı olarak artışlar gösterdiği belirlenmiştir.

Anahtar Kelimeler: Çocuk, Büyüme, Spor

Abstract: Objective: The aim of this study is to examine some anthropometric and physical parameters of the children participating in sports activities between the ages of 4-13 related to age and sex. **Method:** The research group consists of 629 children as 200 girls and 429 boys between the ages of 4-13 studying in the primary schools and training in the private sport centers. Some anthropometric measurements and hand grip, flexibility, vertical jump, standing long jump, medicine ball throw, 10-20 meters sprint and agility tests were respectively applied to the research group. **Results:** It is seen that boys have higher rates than girls except some age groups in the tests of standing long jump, hand grip, vertical jump and medicine ball throw applied to the research group. Similar values have been observed in children up to 6 years according to flexibility rates, but it is determined that girls have higher values from this age. When the sprint abilities are examined, it is seen that boys have lower sprint rates in many age groups. For agility ability, it is determined that boys have lower time rates in all age groups. Finally, it can be said that the anthropometric features of the children between the age of 4-13 increase depending on physical development. When examining the motoric features, it is seen that the development of girls and boys is similar up to 10 years depending on age development. However, boys show more development than girls in the areas requiring strength, speed and agility depending on muscle structure after 10 years. **Conclusion:** As a result, it was determined that some parameters increase depending on age and gender.

Key Words: Child, Growth, Sports

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INTRODUCTION

One of the fundamental aims of communities is to educate healthy individuals in physical and spiritual terms. Since all the development of the child is closely related to physical development, attention in contemporary countries has been directed towards childhood sports events (Mengütay, 2005: 72).

Sports should be in the early years of the child's life because they will play an important role in cognitive development and socialization in the child's growth, maturation (Muratlı, 1997:14). By considering the versatility of children in the stages of growth and development, it is the beginning of the most frequently asked questions in sports circles and in the world of science in the following years (Açıkada, 2004:16).

The research has revealed the necessity of starting sports activities in childhood in order to achieve the expected success in sports. In this regard, developed countries focus on the activities of childhood sports. Because children's trainings have a unique set of features (Mengütay, 1999:72).

The norms of physical fitness for children, in general, assess the levels of physical fitness for children and write prescriptions for exercise and activity programmes and to supervise or observe the changes in physical fitness over time. It can also be used to identify the

individual or groups' physical fitness status. However, the norms cannot be used to test success in competitions and the success of any sporting behaviour. However, the fundamental norms of the population play an active role in interpreting the physical suitability of individual and groups. These norms are always considered a critical material in controlling and defining the physical fitness changes of the group it represents (Ross et al. 1985:1046).

Ringebach and Amazeen, (2005) stated that "An athlete with good coordination can perform more effectively for longer periods. He can perform better and longer because he is less likely to suffer from muscle weakness while performing the movements" (Suna et al., 2016: 14).

The growth and development processes of children show individual differences. The expected development by the age of the calendar is known to be early in some children and late in some children. When it comes to sports, the conflict between children's calendar age and biological age has been subject to scientific research in different aspects (Mirwald, 2002: 689).

Kraemer and Fleck, (2005) mention that there are several factors affecting growth and development, one of which is gender. In addition to some differences in the growth and deve-



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lopment processes related to gender, these girls are known to develop men in various areas earlier (Yaman & Zorba, 2016: 94).

In this regard, the purpose of the research is to examine some of the anthropometric and physical parameters of children participating in sports in the 4-13 age range in the province of Ankara by age and gender.

METHOD

Research group

The research group consist of girls and boys in the 4-13 age range in Ankara which is continuing to study at different times in the Special Sports Center. Under the cross-sectional screening model, some anthropometric and physical tests were applied on the evaluation of physical suitability. The research group, which is registered in the Private Sports center, continues to be a one year and over sports multi-branch education system 4-13 age group (Group of Girls; $N_{4\text{ age}}=9$; $N_{5\text{ age}}=28$, $N_{6\text{ age}}=20$, $N_{7\text{ age}}=36$, $N_{8\text{ age}}=31$, $N_{9\text{ age}}=28$, $N_{10\text{ age}}=14$, $N_{11\text{ age}}=20$, $N_{12\text{ age}}=6$, $N_{13\text{ age}}=8$; Male group; $N_{4\text{ age}}=19$, $N_{5\text{ age}}=58$, $N_{6\text{ age}}=44$, $N_{7\text{ age}}=81$, $N_{8\text{ age}}=68$, $N_{9\text{ age}}=55$, $N_{10\text{ age}}=32$, $N_{11\text{ age}}=41$, $N_{12\text{ age}}=14$, $N_{13\text{ age}}=17$) Total 629 children (200 girls and 429 males) have formed.

The research group's 1-year multi-skill movement program has been conducted in different training branches, up to 4 days a week,

and 1.5 hours a day. Course contents are aimed at developing basic skills specific to branches. The distribution of branches and activities (fitness, educational games, skill coordination, gymnastics, swimming, tennis, badminton, basketball, handball, football, volleyball and table tennis) varies according to age groups.

With the consent form organized by the Ethics committee, the parents permitted their children to participate in the test and still formed a research group of children who continued to study in an institution. In order to carry out the research, 29.06.2012 dated and 12/08 numbered Kırıkkale University Ethics Committee was approved.

Data Collection Tools

Length and body weight measurement applied to the research group, was 0.01 kg and 0.01 m. In the sensitivity of stadiometer, Tanita device for the percentage of body fat, reaching the reach table for flexibility measurement ($\pm 1\text{mm}$), for speed and quick measurements Newtest 2000 Brand Fotosel ($\pm 0.01\text{ sn}$), the meter for long jump measurement with the specified mat, vertical jump measurement for the "Bosco Contac mat" ($\pm 0.001\text{ sec}$) and the Takei brand hand dynamometer for hand grip force were used.



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Collection Of Data

Priority Kırıkkale University Specialization thesis approval of the ethical board of the relevant primary schools and sports centers to carry out measurements in order to perform the necessary locations registered in these institutions. The number of girls and boys in the 4-13 years range the has been identified. In the continuation of the study, the family consent forms prepared in accordance with the ethical board were taken to the families of the relevant students and their measurements were made according to the institutions.

Measurements were conducted within 1 month after the ethics committee approval was received for the research group. The Special education center has been measured on the specified days of children arriving on different days. Measurements were primarily carried out in body weight, length and anthropometric measurements. Then the students, after a 5-minute warm-up; dominant hand grip force, reach, speed and velocity measurements were taken respectively. Measurements were carried out during the morning hours when students participated in the work on the same day.

While physical fitness tests are applied, the tests are arranged in a way that does not create fatigue in the individual. In our study, a ranking is provided to ensure that tests do

not fatigue or that the tests used in the same muscle groups do not come back in succession.

Length and body weight measurement:

Body weight measurements were measured in standard sports clothing (shorts, t-shirts), without shoes, according to standard techniques. The subject's foot is bare, anatomically asked to release his arms. For length measurement, while in the case of the head horizontal, the heel of the test was kept upright by the wall, the heels, hip dislocation, scapuline and the back part of the head were in contact with the wall, while the ruler vertex was compressed and measured in cm (Zorba, 1999: 337).

Body mass Index (BMI): Each child's "body mass Index" was calculated using the resulting weight and length measurements. BMI is the ratio of body weight (kg) to the square of length in meters (Poskitt, 1995: 961).

Body fat percentage: While the measurements of the individuals were taken, the device was asked to stand on the bare feet on the metal surface. In Tanita BIA Analyzer, the percentage of body fat (BFP) values were obtained by the manufacturer's formula (Poskitt, 1995: 963).

Speed measurement: The measurement was made with the Newtest 2000 brand Photocel. The length of the running field was determined as 20 m. A distance of about 5 meters



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from the finish line was left as a stop distance. Starting from the exit line 10. and 20. At the beginning and end and intermediate phototorrents (10 m) are available in the meter. Two trials were made and adequate rest was achieved. Best recorded rating (Chu, 1996: 27).

Vertical jump measurement: Bosco mat was used in vertical jump measurement. The athlete was asked to wait for his hands on the floor. After jumping in the air, knees, calves and ankles were stretched to the fingertips and then landed on the heels (Tyson, 2004: 52).

Long jump measurement: the subject, from the back of the starting line on the ground, the feet are open at the shoulder width, with the help of the arms bent from the double foot knees, using the maximal force in a linear direction to reach the farthest point Jumped. The distance between the starting line and the track that the athlete left closest to the line was recorded in meters. The Test was repeated twice and the higher value was based (Chu, 1996: 63).

Flexibility measurement: The subject sits on the floor with a bare foot base and reaches the test table. The body (waist and hips) leaned forward and reached the front as far as the hands could reach the front of the body without bending the knees. Attempted to stay

at the farthest point. The Test was repeated twice and the higher value was recorded (Mackenzie, 2005: 14).

Hand Grip strength measurement: The Holtain brand hand dynamometer is adjusted according to the hand size of the test, the subject's elbow without bending the lever to a straight and shoulder 10-15 angles to the side of the hand while trying to squeeze as much dynamometer as possible. The best performance was determined after 4 attempts with both hands of the subject. The dynamometer was reset after each attempt, and performance was best evaluated (Pekel et al. 2006: 299).

Health ball throwing test: The test measures the rapid force of flexser muscles in the shoulder circumference and abdomen. The feet of the subject must be parallel to each other, the face is taken forward with a constant distance of 2 kg of health ball, and the force to take back the arms. Then the ball with the maximal power is laid forward, with double hand. The distance between the ground and the front foot of the health ball was measured. The result was recorded (Mackenzie, 2005: 14).

Agility test: The pro-agility Agile test area, also known as the 20-yard running test, is determined by placing markers to the left and right of 5 yards (4,57 m) of the starting line. The Photocel gate was placed on the starting



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line. The participant has replaced the start line before the application starts. When ready, it ended the test by touching the marker on the right and then tapping the marker on the left, passing through the starting line (Bayraktar, 2013: 8).

Statistical Analysis of Data

The average and standard deviation values for the anthropometric and physical parameters obtained from the research group were found. SPSS 17.0 Package program was used

to determine changes in age groups depending on gender.

FINDINGS

The graphs and interpretations of statistical analysis (mean and standard deviation (S.D)) results for the values of the motoric and Anthropometric properties obtained from the children who comprise the research group are given below.

The average values for the body weight parameters of the children who comprise the research group are given in Table 1.

Table 1. Average Values for The Parameters of Body Weight (Kg) According to Age of Children

Girls	4 Age	5 Age	6 Age	7 Age	8 Age	9 Age	10 Age	11 Age	12 Age	13 Age
Mean	16,56	19,5	21,22	24,79	27,77	31,57	34,79	40,38	44,1	48,28
S.D	2,11	4,51	4,17	8,12	5,04	7,63	10,98	12,51	11,43	6,20
Boys	4 Age	5 Age	6 Age	7 Age	8 Age	9 Age	10 Age	11 Age	12 Age	13 Age
Mean	18,96	20,02	22,15	25,58	26,55	30,57	34,84	39,28	47,16	52,66
S.D	3,96	3,12	4,98	6,75	6,19	6,12	10,64	12,27	12,15	11,90

The body weights of the girls in other age groups with the average age of 4 years, 6 years, 7 years, 10, age, 12 and 13 age boys are higher than the body weights of the female children who comprise the research group when examining Table 1 average male athletes' body weights are higher than average.

The average values for the body fat percentage (BFP) parameters are given in Table 2 according to the age of the children who created the research group in the Tanita BIA analyzer with the manufacturer's formula.



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Table 2. BFP (%) of Children by Age Average Values for Parameters

Girls	4 Age	5 Age	6 Age	7 Age	8 Age	9 Age	10 Age	11 Age	12 Age	13 Age
Mean	14,23	20,37	22,27	26,33	27,48	29,63	27,44	32,66	32,38	29,25
S.D	7,33	11,15	10,54	11,48	6,92	7,84	10,51	9,68	9,87	12,5
Boys	4 Age	5 Age	6 Age	7 Age	8 Age	9 Age	10 Age	11 Age	12 Age	13 Age
Mean	10,84	14,16	18,38	21,45	19,21	20,54	30,17	27,74	33,05	34,49
S.D	6,77	5,75	9,34	9,31	9,23	8,35	10,58	10,92	15,24	15,52

When Table 2 is examined, the group of children aged 10, 12 and 13 years of age, the BFP averages of boys and girls in other age groups where children are more than the BFP

averages of female children BFP averages of male children's BFP averages.

The average values for the age-by-length parameters of the children who comprise the research group are given in Table 3.

Table 3. Average Values for Children's Age-Relative Length (cm) Parameters

Girls	4 Age	5 Age	6 Age	7 Age	8 Age	9 Age	10 Age	11 Age	12 Age	13 Age
Mean	101,44	109,26	113,49	118,97	126,26	129,97	132,51	142,45	148,13	155,63
S.D	3,28	8,17	5,21	10,11	8,17	8,31	8,14	8,6	5,19	6,73
Boys	4 Age	5 Age	6 Age	7 Age	8 Age	9 Age	10 Age	11 Age	12 Age	13 Age
Mean	107,07	108,81	114,74	120,14	124,21	131,37	136,51	143,67	150,04	155,46
S.D	10,41	6,46	6,51	7,51	8,54	5,58	6,93	7,12	11,21	11,96

When examining the Table 3, the 5 and 8 years of age girls children with the average length of the height of the boys in other age groups higher than the average of the height of the boys' length of the male athletes.

The average values for long jump parameters are given in Table 4 by the age of the children who make up the research group.



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Table 4. Average Values for Long Jump (cm) Parameters of Children by Age

Girls	4 Age	5 Age	6 Age	7 Age	8 Age	9 Age	10 Age	11 Age	12 Age	13 Age
Mean	58,88	72,5	79,95	85,08	98,06	98,47	101,5	119,55	105,5	156,88
S.D	14,41	20,12	20,75	26,68	19,07	28,73	23,64	25,1	16,97	38,71
Boys	4 Age	5 Age	6 Age	7 Age	8 Age	9 Age	10 Age	11 Age	12 Age	13 Age
Mean	62,5	70,78	81,85	91,91	104,77	114,67	117,89	124,62	125,64	140,6
S.D	29,96	19,36	22,14	26,8	26,86	23,72	24,24	31,02	19,07	33,17

When examining the Table 4, the research group consists of 5 and 13 age girls who have long jump values by stopping boys children from long jump values, while other age groups are better at stopping boys' long jump va-

lues while the girls It is better than the values of children.

The average values for the hand grip strength parameters of the children who comprise the research group are given in Table 5.

Table 5. Average Values for The Parameters of Hand Grip (kg) According to Age of Children

Girls	4 Age	5 Age	6 Age	7 Age	8 Age	9 Age	10 Age	11 Age	12 Age	13 Age
Mean	7,1	7,71	7,06	7,59	9,6	9,97	10,84	13,19	15,38	19,24
S.D	2,97	2,96	1,85	3,25	3,12	2,9	4,38	4,46	1,72	7,71
Boys	4 Age	5 Age	6 Age	7 Age	8 Age	9 Age	10 Age	11 Age	12 Age	13 Age
Mean	7,32	7,59	7,83	8,87	9,24	11,13	11,36	14,04	17,93	20,92
S.D	2,43	1,94	2,21	3,14	3,29	3,27	3,6	4,5	5,51	9,74

When examining the table 5, the study group of 5 and 8 years of age girls' hand grip strength values are better than the values of male children's hand grip force, whereas ot-

her age groups boys children's hand grip values better than girsl values.

The average values for the vertical jump parameters of the children that comprise the research group are given in Table 6.



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Table 6. Average Values for Vertical Jump (cm) Parameters of Children by Age

Girls	4 Age	5 Age	6 Age	7 Age	8 Age	9 Age	10 Age	11 Age	12 Age	13 Age
Mean	9,57	14,08	15,49	14,15	16,43	16,77	16,68	17,78	15,17	22,54
S.D	5,44	4,93	4,58	4,8	4,44	5,62	3,81	6,09	1,94	2,96
Boys	4 Age	5 Age	6 Age	7 Age	8 Age	9 Age	10 Age	11 Age	12 Age	13 Age
Mean	11,2	13,72	13,69	14,62	17,52	17,26	15,82	18,19	18,92	21,36
S.D	6,66	5,3	5,22	5,16	4,49	5,07	5,01	4,87	5,47	4,97

When examining the Table 6, the children of 5, 6, 10 and 13 age girls, vertical jump values are higher than the vertical jump values of male children, whereas other age groups

have children's vertical jump values higher than their values.

The average values of the children who comprise the research group in relation to the age of flexibility parameters are given in Table 7.

Table 7. Average Values for The Flexibility of Children by Age (cm) Parameters

Girls	4 Age	5 Age	6 Age	7 Age	8 Age	9 Age	10 Age	11 Age	12 Age	13 Age
Mean	24,04	23,62	26,73	25,21	26,87	24,04	27,03	20,44	28,92	26,67
S.D	4,69	5,92	4,77	5,76	6,02	7,1	7,08	8,41	6,74	7,84
Boys	4 Age	5 Age	6 Age	7 Age	8 Age	9 Age	10 Age	11 Age	12 Age	13 Age
Mean	24,38	23,09	24,17	23,62	21,79	23,26	18,69	18,33	17,58	15,5
S.D	6,16	5,7	4,72	5,39	6,36	7,62	6,31	7,99	8,66	6,9

When examined in Table 7, the 4-5 age of boys and girls who comprise the research group, the flexibility values are similar, and the flexibility values of girls in other age groups

were better than the values of male children's flexibility.

The average values for the health ball throwing parameters of the children who comprise the research group are given in table 8.



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Table 8. Average Values for Health Ball Throwing (m) Parameters by Age of Children

Girls	4 Age	5 Age	6 Age	7 Age	8 Age	9 Age	10 Age	11 Age	12 Age	13 Age
Mean	1,86	1,79	1,95	2,23	2,8	2,91	3,18	3,77	3,72	4,88
S.D	1,96	0,76	0,56	0,67	1,23	0,85	0,83	0,96	0,72	1,12
Boys	4 Age	5 Age	6 Age	7 Age	8 Age	9 Age	10 Age	11 Age	12 Age	13 Age
Mean	1,6	1,94	2,15	2,69	2,8	3,31	3,42	4,25	4,54	5,15
S.D	0,94	0,82	0,95	1,08	0,7	0,87	0,85	1,44	0,66	1,85

When examining Table 8 the study group of 4-year-olds girls, health ball throwing values are better than the values of the male children's health ball throwing, while other age groups of girls' health ball throwing values were better than boys throwing values.

The average values for the 10 m speed parameters according to the age of the children who comprise the research group are given in Table 9.

Table 9. Average Values for 10 meter Speed (sec) Parameters Based on Age of Children

Girls	4 Age	5 Age	6 Age	7 Age	8 Age	9 Age	10 Age	11 Age	12 Age	13 Age
Mean	3,69	3,2	3,31	3,05	2,7	2,73	2,73	2,6	2,64	2,31
S.D	0,44	0,44	0,71	0,39	0,24	0,33	0,27	0,18	0,22	0,13
Boys	4 Age	5 Age	6 Age	7 Age	8 Age	9 Age	10 Age	11 Age	12 Age	13 Age
Mean	3,47	3,28	3,12	2,98	2,75	2,71	2,64	2,45	2,4	2,47
S.D	0,57	0,35	0,34	0,52	0,24	0,43	0,3	0,31	0,22	0,3

When examined in Table 9, the 5, 8 and 13 age girls who participated in the research group are better than male athletes with 10 m speed capabilities, and other age groups are

better than female athletes who have 10 m speed abilities.

The average values for the 20 m. Speed capabilities of the children who comprise the research group are given in Table 10.



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Table 10. Average Values for 20 Meter Speed (Sec) Capabilities According to Children's Age

Girls	4 Age	5 Age	6 Age	7 Age	8 Age	9 Age	10 Age	11 Age	12 Age	13 Age
Mean	7,21	6,33	6,3	5,84	5,12	4,95	5,08	4,71	4,77	4,2
S.D	0,85	1,24	0,97	0,89	0,49	0,53	0,53	0,43	0,4	0,31
Boys	4 Age	5 Age	6 Age	7 Age	8 Age	9 Age	10 Age	11 Age	12 Age	13 Age
Mean	6,96	6,26	5,85	5,57	5,1	4,95	4,78	4,42	4,37	4,45
S.D	1,21	0,77	0,88	0,85	0,57	0,79	0,68	0,48	0,48	0,52

When the Table 10 is examined, the 13-year-old girls who participated in the research group are better than male athletes of 20 m speed, and in other age groups, 20 m speed of male children is better than girls athletes.

The average values for the agility (sec) parameters of the children that comprise the research group are given in Table 11.

Table 11. Average Values for Agility (Sec) Parameters for Children's Age

Girls	4 Age	5 Age	6 Age	7 Age	8 Age	9 Age	10 Age	11 Age	12 Age	13 Age
Mean	11,67	8,75	8,64	7,94	7,21	7,2	7,15	6,78	6,89	5,99
S.D	2,69	2,06	0,69	0,68	0,69	0,65	0,8	0,72	0,38	0,16
Boys	4 Age	5 Age	6 Age	7 Age	8 Age	9 Age	10 Age	11 Age	12 Age	13 Age
Mean	8,73	7,91	7,78	7,62	6,9	6,3	6,38	5,73	5,93	5,71
S.D	2,8	2,47	2,03	1,44	1,37	1,81	1,5	1,49	0,69	1,38

When examined in Table 11, it is observed that the agility values of male children in all age groups participating in the study group are better than the agility values of girls.

cal parameters of the children who have done selected sports.

DISCUSSION

This section includes recommendations for results and similar studies based on findings from some of the anthropometric and physi-

Similar studies have been analysed to monitor the physical developments of the research group and to have information about their physical structure according to the *body length* parameter. In a study, the average aspect value of the 10 age group 78 girls was 137,2±6,7 cm. While the average value of



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the same age group 45 male was obtained 137,3±6,7 cm. 11 age group 97 girls in the subject of the 139,7±8,0 cm corresponding to the value obtained, 131 male in the subject of the same variable was determined as 139,1±6,5 cm. The average length of the 142 girls in the 12-year group was 145,2±8,4 cm. while 152 males had the same value as 144,6±7,4 cm (Kavak, 2006: 14).

As a result of our study, there is no difference between the lengths of girls and boys in many sources, but it shows that boys are more developed than girls, except for early development children. This is because the adolescent period of girls is thought to have been completed before men.

When the *body weight* parameter is examined, it is seen that the 10-11 age group is parallel with the girls in the same age group in terms of values. The 12-year-old males also show parallelism as they are at age 10 and 11. However, in many studies, there is no apparent difference in the physical aspect of girls and men in this age group, except for early development children, the onset of 13 has shown that boys are more developed than girls. However, it is noted in various sources that the girls, which show a little more development than the physical aspect of the age of 12. After this age, development is returned in favour of boys.

In the study of 12-14 age group children in Erzincan Province, the average 40,9±9,17 kg in the center of the body weight in women aged 12 years. While, the mean districts 36,24±7,70 kg. In men, the center of the city averages 39,44±10,68 kg. While, the mean districts 35,79±6,85 kg (Çolak & Kaya, 2006: 33).

In our research, when the body weights are examined, there is no apparent difference between the 4-13 age group and the boys and girls, and children from 10 years old have shown more growth. After this age, it is stated in several different sources of development. As a cause of this increase, children are considered to have increased length.

When the *body mass index* values were examined, in a study conducted on the 12-14 age group 177 children in the province of 18,64±2,80 kg/m² in the center of Erzincan city the body mass index in women aged 12 years, the average of the districts 17,58±3,08 kg/m², in boys whereas the center of the province was 18,11±3,21 kg/m², the average of the districts was 17,34±2,51 kg/m² (Çolak & Kaya, 2006: 40).

According to result of the study, the average 18,0±2,4 kg/m², 12-year-old 69 male child of 11-year-old 21 male subjects in primary school was reached in the mean 18,9±3,5 kg/m². In the same study, the average value of the 11-year-old 40 girl was obtained as 17,7±2,4



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kg/m², while the average value of the 12-year-old 143 girl was 19,4±3,5 kg/m² (Bodur & Uğuz, 2007: 21).

When the *body fat percentages* are examined; In a study conducted on a total of 24 male basketball players aged between 13 and 14 years of age, the percentage of the experimental group body fat was 19,54±5,44, and the post-workout averages were determined as 16,89±4,97 (Erol et al. 1999: 12).

In a different study, a total of 52 male children aged between 10 and 13 years of age were 14,5±4,9 of the average body fat percentage (Pekel et al. 2006: 308).

When the BFP and BMI are examined, the values in all age groups are not observed in a significant difference between boys and girls, but the increase in values can be said to be due to growth in height and body weight.

When the *vertical jump* parameter is examined, the vertical rat, which is one of the explosive indicators between the ages of 10-12 and the development of physical development and performance, is parallelism in the evolution of both girls and men groups Seen. In a study, the average 24,77±5,12 cm on the 84 male children who do not do sports in the 10-12 age group., the minimum value is 13 cm., and the maximum value is 40 cm (Bayraktar, 2013: 7).

In a different study of the 6-11 age group 776 girls, a vertical jump average of 10 age group girls, including 100, is 29,25±5,66 cm while the minimum value is 16 cm and the maximum value is 48 cm. The average value 31,40± 5,75 cm was found in the 11-year-old girls who attended the 44 experiment. (Turgut & Çetinkaya, 2006:1041).

The values obtained are parallel to the results of our research. There are no apparent differences between girls and men in vertical jump values. The vertical jump between physical development and performance development is one of the indicators of explosives, which is seen to resemble the development of men and girls. The reason for this is thought to be similar to the development of the leg strength of boys and girls.

When the values of the 10 and 11 age group girls and boys of the right hand grip strength are examined, the measurements are shown to be parallel to each other, as compared to girls, the right hand grip strength of the boys in the 12 year group increased slightly. Some sources indicate that children from the age of 10 have started to secrete hormones according to gender, and these hormones have been increased since 11 years.

In a study conducted in the 10-12 age group, the 15,7± 3,1 kg of the right hand grip force on the 84 male child who did not do sports.



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When you find; The minimum value is 7,9 kg. The maximum value is 23,6 kg have been found. According to the research results that only the maximum value is high according to this study, we can indicate that some of the early children in the 12 age group may have high values. As we have stated earlier, some of the children with early development will have high values (Bayraktar, 2013: 6).

It is thought that the increase is linear because the movement is not a very complex movement in men and girls as a cause of this similarity.

When the *long jump* parameter is examined, it is stated in a variety of sources, which are determined to be one of the long-jump explosive force indicators in each age group and in which the gender growth is determined.

As a result of the study, 10 years of age group 100 girl's child, the long jump value of the average $123,81 \pm 20,15$ cm. The minimum value was 85 cm and the maximum value was 184 cm (Turgut & Çetinkaya, 2006:1041).

Another study that can be associated with this subject is the norm standards that need to be obtained at the first stage of the choice of ability to stop the long jump value of 10 years in girls 165 cm. 175 cm in males. He has determined 175 cm in girls of 11 years and 190 cm in males. The study supports research in 11 age group girls, while the maximum me-

asurements in other groups are over 5-10% (Biçer & Akıl, 2005: 754).

It is thought that the increase is linear because the movement is not a very complex movement in men and girls as a cause of this similarity.

In terms of *health ball throwing* values, gender and age groups, we see that there is also improvement in the health ball throwing by stopping in all categories. The average value was $419,2 \pm 87,9$ cm in the 10-year-olds, and in the 11 age group, this value rose to $481,9 \pm 92,7$ cm. and $543,8 \pm 116,3$ cm in 12 age group girls. The average is $471,5 \pm 85,4$ cm. In the 10 age group of males, the same variable was determined as $531,6 \pm 84,4$ cm in the 11 age group, the 12 age group was evaluated as $579,1 \pm 113,9$ cm in males.

According to a study, one of the eight criteria that Bulgarian children should achieve in the first election stage is a health ball throwing of 700 cm in males of 10 years. The desired value in the same age group girls is 650 cm. 11 age group girls for the male children, the value specified as 700 cm is determined to be 750 cm (Jonston et al. 2003: 627).

The results of this research demonstrate the parallels with the results of our research. The long jump, the right hand grip force and the health ball throwing values from the force indicators do not show significant differences



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in the age of 10, but after the age of 10, men have shown more improvement depending on muscle development. This is due to the fact that the muscle structure of men is more than girls.

When the *flexibility* parameter is examined, the average value determined as $18,7 \pm 5,2$ cm in the 10 age group girls was determined as $20,0 \pm 6,4$ cm in 12 age group girls. The average value of $17,3 \pm 5,4$ cm in males of 10 age group was determined as $18,4 \pm 5,6$ cm in males of 12 years. As a result of the research, 10 years of age group the average $24,98 \pm 6,39$ cm in the value of flexibility on the girl; The minimum value was 9 cm and the maximum value was 41 cm. The average value of the 11 age group of 44 subjects was $26,57 \pm 7,68$ cm while the minimum value was 5 cm and the maximum value was 41 cm (Turgut & Çetinkaya, 2006).

In a study, the new norm under the name “New standards for Fitness measurements (NCYFS)” is also the maximum value in men aged 10 to 38,2 cm, the value of 75% is 29,3 cm, 50% value is 26,8 cm and 25% is determined as 21,7 cm. The parallelism of the norms in the 11 and 12 age group is remarkable. In the men of these age groups, the value of 75% corresponds to the maximum value set to 39,5 cm. 30,6 cm. 50 % is 20 m (Ross et al., 2007: 1056).

When the flexibility parameters are examined, the flexibility of up to 7 years of age is observed to develop more in girls, depending on muscle and body development. It is thought that the flexibility in performance with age declines less than men in girls because of the fact that girls do not decrease the performance of men depending on age.

When the *speed* is examined, an average of 20 m speed run is $4,63 \pm 0,37$ sec in a study conducted on the 10-year-old group of 100 girls. When you find; the minimum value is 4,05 sec and the maximum value is 5,72 sec was measured. The average value $4,22 \pm 0,38$ sec in the 11-year-old girls consisting of 44 subjects. When determining the minimum value is 3,70 sec, the maximum value is 5,35 sec and also $4,38 \pm 0,41$ sn. in 10-year-old girls in the 20 m. speed run, in which the development of all age groups and gender is still ongoing $4,23 \pm 0,29$ sec in 12 age group women obtained. $4,17 \pm 0,34$ sec in males of the age group 10, $4,08 \pm 0,23$ sec in 12-year-old males (Turgut & Çetinkaya, 2006: 1041).

When the *agility* and speed capabilities are examined, there are no apparent differences between the groups until the age of 9, while the males are more developed after the 10-year group. The reason for this is that after the age of 10, the muscle structures of men are more developed in various sources.



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The reason for this is that men have more muscular structures, and adolescence is thought to increase performance in men.

CONCLUSIONS

Anthropometric measurements are observed to increase according to the physical development of the anthropometric properties of the 4-13 age group children. When the motoric properties are examined, it can be said that the development of men and girls is similar to the age of 10, depending on age development. But depending on the muscle structure, we can say that men are more evolved than girls after the age of 10 in areas requiring force, speed and velocity. As a result, some parameters increase depending on age and gender.

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