International Journal of Science Culture and Sport
July 2014 : Special Issue 1
ISSN : 2148-1148
Doi : 10.14486/IJSCS118

The Evaluation of the Physical Characteristics of Football Players at the Age of 9-15 in Accordance With Age Variables

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Abstract

This study has been conducted with the aim of evaluating the physical characteristics of children at the age group of 9-15, who play football at amateur level, in accordance with age.

The domain of the study consists of amateur male football players(n=82) who play actively in Kayseri and have been selected with random sampling method. In order to investigate the effects of football training on physical parameters, some tests selected from Eurofit test battery such as hand grip strength, plate tapping, 30 seconds of sit-ups, flamingo, standing broad jump, sit and reach, 20 meters shuttle run, as well as 20 meters sprint and anthropometric measurements (height, weight and body mass index) were applied to the subjects. The statistical evaluation of data is based on 0.05 significance value; after the descriptive statistical and One-Way ANOVA tests have been applied, Duncan has been used as second level test in order to evaluate the differences between the groups. According to the results, some substantial differences($p<0,05$) between the players with respect to height(cm), weight(kg) left-handed grip strength(kg), right-handed grip strenth(kg), plate tapping(sec), flexibility(cm), standing broad jumping(cm), 20-meter-shuttle run test (ml/kg/min), 20-meters-sprint were observed while no crucial differences($p>0,05$) have been found with respect to parameters such as BMI(%), sit-ups (30 sec/times), flamingo balance test(errors).

It has been determined after the evaluation of the results that the differences associated with the physical properties of the footballers between 9 and 15 years old affect the development of the players in accordance with their ages and that sports contribute positively to their physical properties in terms of development level and time.

Keywords: Children, Eurofit, Football

1. Introduction

The physical activity levels of children and young people have been investigated more and more since the number of studies increased. The findings are both ambiguous and different from each other (Riddoch and at all..1995). Scientific studies attract attention to having a healthy living style and doing physical activies from childhood to adulthood. The determination of the positive effects of physical activities and the negative impacts of sedentary life style have encouraged the researchers to focus on the levels of the pyhsical properties of children(Hoos and at all..2003). The pyhsical activity and convenience in addition to nutrition play an important role in adults' health. Some physical and physiological changes such as the decrease in the level of physical activities and pubertal growth attack during the adolescence period prove that the determination of the children's suitability is of great importance(Çolak et al.,2007). Activity level may also imply the normal level of growth or the probable health problems. Inactive life style along with aging increase the level of risk of many diseases. The individuals with physical activity have fewer problems while their body compositions are better (Haskell et al.,2000).

Sports play an important role for young generations both physically and mentally. Physical training and sports are complementary and essential components of education in civilized and modern socities. One of the main reasons for this is the difficulty of having the habit of doing sports and mobility in older ages compared to younger ages(Çalış et all.,1992). Children in this kind of socities have to be encouraged to engage in sports in order to have qualified and elite sportsmen and women. In other words, the significance of sports around the world and the ever-rising competition between the countries require the qualified sportsmen to be identified with no mistake and as early as possible. It is quite crucial to increase the performance of the identified children and adopt them to the society, which could only be managed by determining and evaluating the level of their motor development and their body structures with respect to their physical conditions(Şahin et al.,2012).

2. Materials and Methods

Sampling: Domain of the study group is composed of the children who play football in Kayseri. Sampling group consists of active and volunteer amateur male football players(n=82) selected with random sampling method.

Method: 8 performance tests of all sportsmen have been evaluated. In this research, Eurofit testing battery was used(Council of Europe,1988). The results of the Eurofit testing applied to the subjects was recorded in "Subject Test Follow Form" which was prepared previously. The subjects were given any information about measuring tools and testing prodecures before taking the tests and the tools used during the test were introuced to them in addition to supporting them verbally to maintain the best results.

Motor Coordination Tests

Flamingo Balance Test: The subject try to keep balance as long as possible on prefered foot on a wooden balance tool which is of 50 cm length,4 cm height and 3 cm width. The subject stood like a flamingo by bending the other leg backward and holding with the hand at the same side as the bent leg. The subject was allowed to use the helper's arm to put the position into balance. The test started the moment the subject left the arm to manage to keep balance

for one minute. The test was interupted whenever the subject lost balance. After every interuption the same procedure was applied and this continued this way until the balance was kept for one minute. The duration of the balance loss was recorded as score within one minute.

Standing Broad Jumping: The subjects stood behind the jumping line with their feet adjacent and they tried to jump forward as far as they could bending their knees,pushing their legs with their arms forward. The test was carried out twice and the higher score was recorded in centimeter.

Hand Grip Strength Test: The dynamometer was squeezed firmly twice with one hand so as to hold it with about 30 degrees between arm and body and the higher score was recorded. Grip Strength Dynamometer T.K.K 5101 Grip D (Japan) was used for this measurement.

Plate Tapping: The two plastic disks with a diameter of 20 cm each were put on the table. The distance between the centers of the disks was arranged to be 80 cm.(So the distance between the edges was 60 cm). The 10x20 cm plate was placed just in the middle of the disks. The subject stood with legs slightly opened to the sides in front of the table. The subject put one of his hands on the plate. And he put the other hand on the disk in opposite direction to the first hand by moving it over the first hand. The subject tried to touch the disks as quickly as possible by moving the first hand over the other hand put which was put on the disk. He tried to touch with one hand from one disk to the other for 25 times as quickly as possible. The results were assumed as one tenth of a second and scoring was made by removing the decimal of a second(ie. 12,5 sec=125 points)

Sit And Reach Test: The subject sat in front of a plate with 35 cm length, 35 width and 32 cm height and he was asked to push the ruler slowly forward after putting feet exactly on the inner surface of the plate and to keep them for 3 minutes. The test was performed twice and the higher score was recorded.

Sit-up Test: The subject lies on his back, puts hands on the back of the neck, pulls knees towards him (with 90 degrees) and places the bottom of the feet right on the cushion. While getting up, it was observed that the elbows were forward and the subject touched the knees during the action and both of the hands were put on the back of the neck. The subject tried to make this move as many times as possible in 30 seconds.

20 meters Shuttle Run Test: Shuttle run, as an indication of endurance and maximum aerobic capacity, covers running 20 meters. The speed was determined with a device which gives gradually shorter signals. The subject was required to arrange the speed, to touch the line and finally to run toward the other side after returning within 20 meters. Although the speed was lower in the beginning, it increased slowly and gradually every minute.The signals recognized by the subject were recorded as points while the signals missed were recorded as error. The test was ended when the two successive errors were made. The number of the shuttle were calculated and the corresponding values were indicated in MaxVO2 table.

20 meters Sprint Run: The test started with a whistle and finished after 20 meters. The subject was asked to make the move as quickly as possible and the time was kept with a chronometer. The test was carried out twice and the higher score was recorded.

Anthropometric Tests

Measurement of Height: The height was measured in centimeters while the subject was in anatomic posture, the feet were naked, the breath hold, the head was in frontal plane and the overhead table was touching the vertex point.

Measurements Of Weight And Body Mass Index(BMI): The weight and BMI of the subjects were measured using Tanita body fat analyzer. These measurements were performed only when the subjects with shorts had naked feet and anatomic posture.

Statistical Analysis: The significance level for the evaluation of the statistical analysis was 0.05 and second level Duncan test was carried out in order to investigate the difference between the groups after the One-WayAnova test and other complementary statistical tests.

3. Findings

Some significant differences were observed in height, weight, grip strenthes of left and right hands, tapping the plates, flexibility, stannding broad jumping, endurance and 30-meter sprint run subsequent to the examination of the results. In an attemp to understand the causes of the differences, it was seen that the group of 15-year-old-subjects were the tallest and thegruop had no considerable amount of difference from the group of 14-year-old subjects. Moreover, there was no difference between the groups of 13 and 14-year-old which was also true for the groups of 11 and 12-year-old-subjects. In addition to these findings, the group of 9-year-old subjects was the shortest and had difference in comparion with the group of 10-year-old-subjects. It was also noted that the groups of 9 and 10 –year-old- subjects had differences from all of the other groups.

After the examination of weight results, the 9-year-old-group had some important differences from 11, 12, 13, 14 and 15-year-old-groups and 10-year-old-group had significant differences from 11, 13, 14 and 15-year-old-group as well as the differences between 12 and 15-year-old-group while no such important differences between the other groups was observed. According to the examination results of the difference between the grip strength of left and right hands, the groups of 13, 14 and 15-year-old-subjects had no differences from each other although they had some differences from 9, 10, 11 and 12-year-old-goups. Nevertheless, 9 and 10-year-old-groups had no differences from each other and the group of 9-year-old-subjects possessed some differences from the other groups.

According to the examination of the results of the plate tapping, the group of the 9-year-old-subjects had the longest time and had no differences from 10, 11 and 12-year-old-groups and had differences from 13, 14 and 15-year-old-group. However, the 11-year-old-group had no differences from 12, 13 and 14-year-old-groups and had some differences from the group of 15-year-old-subjects. The group of 15-year-old-subjects had the longest time and had no differences from 13 and 14-year-old-subjects.

The results of standing broad jumping test indicates that the group of 9-year-old-subjects had the lowest score, and had no differences from the groups of 10, 11 and 12-year-old-subjects though they had some differences from the groups of 13, 14 and 15-year-old-subjects. The group of 15-year-old-subjects had the highest score of jumping and they also had different scores from the other groups. In addition, the 13 and 14-year-old-subjects had no different scores from each other while they had some differences from the other groups.

Given the results of the shuttle run test, the groups of 9, 10, 11, 12 and 13-year-old-subjects had no different results from each other but they had diffrences from 14 and 15-year-old-groups. The results of 13-year-old-group were not different from those of 14-year-old-group and had some differences from the results of 15-year-old-group. Moreover, the groups of 14 and 15-year-old-subjects had no differences from each other. Considering the results of the sprint run test, the 15-year-old-group was the fastest of all and they had differences from the other groups. The groups of 9, 10, 11 and 12 year-old-subjects had no differences from each other and however their results had differences from the other groups. The 13 and 14-year-old gruops had no differences from each other while they had differences from the other groups.

Table 1. Eurofit test results.

Variables	Age 9 n=14 X±SD	Age 10 n=14 X±SD	Age 11 n=12 X±SD	Age 12 n=15 X±SD	Age 13 n=12 X±SD	Age 14 n=7 X±SD	Age 15 n=8 X±SD	F	P
Height (cm)	133.29±7.10^{E}	140.57±7.18^{D}	148.83±5.44^{C}	152.33±6.27^{C}	160.71±11.13^{B}	162.83±8.74^{AB}	168.50±9.62^{A}	28,99	0,001*
Weight (kg)	29.85±7.86^{D}	36.10±10.77^{CD}	41.64±8.32^{B}	41.29±10.27^{BC}	44.04±5.47^{B}	49.27±12.70^{AB}	53.78±15.06^{A}	6,59	0,001*
BMI (%)	16.61±3.18	17.97±3.83	18.73±3.10	17.60±3.45	18.52±4.56	17.14±2.40	18.75±3.74	0,617	0,716
Sit-up (30 sec/times)	18.79±4.17	18.00±3.90	17.75±3.88	18.53±3.35	19.08±4.71	18.43±3.20	21.25±2.76	0.81	0.560
Left HGS (kg)	11.43±2.97^{C}	13.79±2.92^{BC}	14.20±2.06^{B}	15.16±3.29^{B}	19.37±3.07^{A}	18.92±2.86^{A}	18.35±1.64^{A}	12,97	0,001*
Right HGS (kg)	11.07±2.85^{C}	12.96±2.45^{BC}	13.90±2.05^{B}	14.50±2.63^{B}	18.98±2.45^{A}	19.20±2.00^{A}	18.35±1.76^{A}	19,77	0,001*
Flamingo (errors)	3.21±2.15	5.00±3.13	3.92±2.35	5.13±2.53	6.00±3.97	3.00±1.73	2.88±2.64	2,117	0,061
Plate Tapping(sec)	176.0±28.95^{A}	172.7±39.75^{A}	157.0±25.40^{AB}	156.8±22.27^{AB}	142.9±20.21^{BC}	137.5±20.92^{BC}	118.8±12.86^{C}	6,153	0,001*
Sit-Reach (cm)	19.21±5,46^{AB}	18,29±4.32^{ABC}	14.50±4,68^{C}	16,53±4.88^{BC}	19.67±3,44^{AB}	19,43±4.86^{AB}	21.88±6,85^{A}	2,524	0,028*
Standing Broad Jump	124,29±18,48^{A}	128,21±19,17^{A}	137,92±11,37^{A}	139,33±21,03^{A}	160,71±19,45^{B}	162,92±33,47^{B}	188,63±26,03^{C}	10,999	0,001*
20m shuttle run (ml/kg/min)	30,32±4,49^{A}	29,39±5,66^{A}	29,94±4,64^{A}	29,57±5,91^{A}	32,02±7,16^{AB}	35,72±7,47^{BC}	39,05±4,52^{C}	3,831	0,002*
20 m Sprint (sec)	4,06±0.27^{C}	3,90±0.27^{C}	4,03±0.32^{C}	3,95±0.35^{C}	3,63±0.25^{B}	3,65±0.25^{B}	3,37±0.29^{A}	7,604	0,001*

A, B, C, D: in the same column row, differences in the avarages that carrying different letters are statistically significant($p<0,05$). HGS: Hand grip strength, BMI: Body mass Index.

4. Discussion and Result

As a result of growth, some changes occur in body, enviroment and proportions and these changes related with some physical factors affect the skills and the performance of the child. The most crucial factors affecting sportive performance are height and weight, both of which are anhtropometric prerequisites in the determination of the developlement and selection of the sportsmen(Sevim et al,1993). The studies indicate that the avarage weights and heights of the children increase over the years. Consequently, the height and weight for age 9 are 133.29±7.10 cm and 29.85±7.68 kg, repectively. The height and weight for age 10 are 140.57±7.18 cm mnd 36.10±10.77 kg, respectively. The height and weight for age 11 are 148.83±5.44 cm and 41.64±8.32 kg, respectively. The height and weight for age 12 are 152.33±6.27 cm and 41.29±10.27, respectively. The height and weight for age 13 are 160.71±11.13 cm and 44.04±5.47, respectively. The height and weight for age 14 are

162.83±8.74 cm and 49.27±12.70, respectively. And finally, the height and weight for age 15 are 168.50±9.62 and 53.78±15.06, respectively.

The research carried out by Tınazcı et al(2004) on primary school students is in accordance with the research performed by Castro-Pinaro et al on children whose ages were between 8 and 17 years. The study also indicates that the height of children aged betwen 12 and 14 years increase about 7-9 cm each year and that those who engage actively in sports in comparison with those who dont actively engage in sports develope more and faster(Akın,2003,Mengütav,1999), which implies that the older age is in accordance with the increase in height and weight. Moreover, Koç et al (2013) determined lower height and weight results than those of the research based on the assumption that the height and weight of children without adequate training were taken as 136.63 cm and 31.83 kg respectively. This finding implies that football training plays an important role in the rate of pyhsical development. Nevertheless, pyhsical enviroment, nutrition and genetical factors contribute to the difference in development as well as the positive effect of sports on bone development(İri et al,2009).

According to the results of the tests, no difference with significance was determined in BMI values. Saygın et al(2005) determined the BMI values of children with an avarage age of 11.16±0.80 as 18.12±3.08. Lovecchio et al(2012) found BMI values of 12-year-old students as 19.1±3.1, for 13-year-old-students as 19.1±3.6, for 14-year-old-students as 19.7±3.4 and for 15-year-old students as 20.2±2.7.The values obtained by our research complies with literature.

In our study, the best sit-up testing (30 sec/times) scores belong to the 15-year-old-group and the scores of the other groups were not so much diffrent from each other. No significant difference between these groups was determined. A study of Baydil(2006) indicated that the sit-up scores of a male group of students with an avarage age of 12.44±0.66 was 22.36±3.25 times and another study by Ziyagil et al (1996) indicated the sit-up scores of an 10, 11 and 12-year-old-groups were 27.20±3.11, 25.00±2.00 and 23.65±2.12 respectively. The reason why the values in literaure are higher than those we determined is probably inadequate muscle strength of the amateur footballers in our research and the higher avarage age of the children in the other researches in the literature.

According to the results of the test, the left and right hand grip strengthes increase gradually from 9 to 13 years old, become steady with no development from 13 to 15 years old. These results don't comply with those of 11 and 13-year-old-group of Pekel et al(2004), 11-year-old-group of Tınazcı et al(2004) and 10 and 12-year-old group of Karacabey et al(2006), which are higher than the values of the subjects in our study. This situation can be caused by both insufficient upper extremity training activities and the slowness of the children in the research. The avarage value of the grip strengthes of the children with an avarage age of 11, 16 years old in a research by Saygın et al(2005) is 14.80, which copmlies with our study while the values in a research by Savucu et al(2005) are higher for the children with the same ages. The reason for this contradiction might be based on the differences in branches and training exercises.

Given the results of the plate tapping test, the duration of the test drop dramatically as the ages become older and the training lasts longer, which is in accordance with the results of the 9 and 10-year-old-group of Erden et al(2009) and the 12 and 13-year-old-group of

Şirinkan(2011). The rapidness has a close relation with muscle strength and it is known that muscle strength increases with age which causes the children to move their hands faster.

In our study, the group of 15-year-old-subjects got the highest scores in flexibility and they had no difference from the groups of 9, 10, 13 and 14-year-old-subjects while the 11-year-old-group got the lowest scores and they had no difference from the 10 and 12-year-old-groups. A study by Özsu(2011) found the flexibility values of a group of 12 to 14-year-old-sportsmen as 19.7±2.6 cm which does not contradict with our study. Flexibility, better movement capability, perfection in skills and coordination are very essential for the footballers to prevent injuries and flexibility itself poses a possitive effect on hips and ankles joints(Güler et all.,2009).

Considering the results of standing broad jumping, the lowest score belongs to the 9-year-old-group and this group has no difference from 10, 11 and 12-year-old-groups. Moreover, they had differences from 13, 14 and 15-year-old-groups while the highest score belongs to the 15-year-old-group which had differences from the other groups. The groups of 13 and 14-year-old-subjects had no difference from each other while they had differences from the other groups. In the study of Günay et al(2011), the standing broad jumping score of the group with 12 and 14-year-old-subjects was 161.91±15.88cm and Arabacı et al(2008) found 203.95±25.58 cm score for the group with an avarage age of 14.65±0.81. The reason why theese scores were higher than those in the study could be attributed to the weakness in the muscle strength of the subjects.

According to the results of shuttle run test, the 9, 10, 11, 12 and 13-year-old-groups had no significant differences from each other while the 14 and 15-year-old-groups had differences from each other. No significant difference was observed between the 13 and 14-year-old-groups but they had significant differences from the 15-year-old-group. Also, no significant difference was observed between the 14 and 15-year-old-groups. The study of Polat et al(2003) implies no difference for the group of 9 and 10-year-old-subjects which shows the endurance increases with age, too.The studies which proves this kind of distinctions will evolve during the early adolescent periods also supports our study(Kürkçü et al,2007).

Given the results of the sprint run test, the 15-year-old-group was the fastest and this group had differences from the other groups while the 9, 10, 11 and 12-year-old-groups had no differences from each other although they had differences from the other groups. The 13 and 14-year-old-groups had no difference from each other though they had differences from the other groups. Diallo et al(2001) found the score of 4.14±0.50sec. for the group of 10 and 12-year-old-subjects and these scores were higher than the scores of the other studies which means they were slower. The findings indicates that training helps increase the speed. Speed is defined as the use of motor actions to the full capacity in the possible shortest time and it is also one of the most important factors that determines the quality in many branches of sports(Ayan et al,2009).

In this study, it can be concluded that the differences between the physical properties of the 9 and 15-year-old-group of subjects who play amateur football are affected by the development process of the children depending on their ages and sports affects positively their pyhsical properties depending on the time.

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