A COMPARISON OF BIOMOTOR PARAMETERS IN AGE GROUPS IN FOOTBALL

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Abstract

The aim of sports training is to achieve maximum individual or team efficiency in a particular sport discipline limited by rules. Sports training focuses on achieving maximum efficiency in motor skills which are closely related to sports discipline. The purpose of this study is to compare anthropometric and motor parameters in different age groups in football. In total 99 athletes of the age group participated in this study; N = 21 (U13), N = 20 (U15), N = 23 (U17), N = 17 (U19), N = 18 (U21). Measurements were performed for anthropometric parameters (weight, body height, waist circumference) and motor skills (explosive force, speed, agility, aerobic capacity). Comparative analyzes by gender were performed for the variables measured in this study by means of T test. The value of 95% of the coefficient was placed in this measurement and statistical analysis performed. Data comparison analysis by age group showed statistical significant improvement by age group from U13 to U17 and no statistical difference between U19 to U21 age group for anthopometric parameters (body weight, height, waist circumference). Data analysis for motor abilities parameters show statistical improvement for U13 to U17 and no statistical significant difference (speed, agility, strength, aerobic fitness and jumping performance) between U19 to U21. This study research show that with increasing age there are improvement for anthropometric and motor parameters from U13 to U19 and no difference for U19 to U21 age groups in football.

Keywords. Football, age group, speed, agility

Introduction

Football is one of the most popular sports disciplines in the world. According to the data on the official website of the international football federation FIFA, they show us that in 2009 over 265 million female and male players participated in various competitions around the world and there are over 211 associations affiliated or cooperating with FIFA in 2021 (FIFA, 2021). Certain data show us high competition in football activities, and in order to achieve the best results, a player must have a certain level of key skills including technical, tactical, mental and motor skills. The latter, together with others, includes the coordination of motor skills, which is the subject of this study. When we talk about effective performance in sports, certain level of motor skills is high on the list (Atmojo, 2010; Opstoel et al., 2015).

This includes motor coordination skills (CMS) which are one of the main factors influencing a player's effectiveness during a match (Chang et al., 2013; Zago et al., 2016; Jaaakkola et al., 2017). These conclusions are supported by studies that show us that when we increase the specific level of motor coordination skills, it is one of the main factors to achieve the performance of the results we aim for (Ljach et al, 2004).

As the research (Dane et al., 2015) explains to us, the main criteria in sports that determine whether a player is chosen to play or not, regardless of the importance of the game, is the assessment of individual potential in which the level of motor coordination skills plays a decisive role. The purpose of this study is to compare anthropometric and motor parameters in different age groups in football. In total 99 athletes of the age group participated in this study; N = 21 (U13), N = 20 (U15), N = 23 (U17), N = 17 (U19), N = 18 (U21).

Methods

The purpose of this study is to compare anthopometric and motor parameters in different age groups in football. 99 female athletes of the age group participated in this study; N= 21 (U13), N= 20 (U15), N= 23 (U17), N= 17 (U19), N= 18 (U21). Measurements were made for anthropometric parameters (weight, body height, waist circumference) and motor skills (explosive force, speed, agility, aerobic capacity). Comparative analyzes were performed by gender for the variables measured in this study using the T test. The 95% confidence level was set in this measurement and statistical analysis performed.

Measurements evaluated with soccer players

Weight and height

The objective of this left is to highlight the current body weight and height of athletes. For this purpose, body height and weight are measured with sports clothes and shoes

removed. The measurement is performed in meters or centimetres according to the type of device

10x5m skill test

This test evaluates the agility of athletes by performing 10 round-trip sprints at a distance of 5 m. Measured time serves to evaluate skill.

The T test

This test serves to evaluate the skill level. It is done by measuring the time spent by the runner according to the distance 5x5m in T shape.

Sprint 10m 20m

This test serves to evaluate the speed of athletes by measuring the time in a distance of 10m and 20m.

Shuttle run test

In an area or sports hall with a wooden floor, two parallel lines are placed about 20 meters away from each other. Athletes should be well informed about the testing procedures and they should warm up the body for about 10 minutes before testing.

High jump test

This test serves to evaluate the level of reliability both from the place and in motion.

The long jump test

The object of this measurement is the explosive strength of the lower limbs. It is measured in cm according to the performed dance.

Statistical analysis

Comparative analyses were performed by gender for the variables measured in this study using the T test. The 95% coefficient value was set in this measurement and statistical analysis performed (descriptive or descriptive analysis and comparative analysis for the measurements performed in this study).

Results

Data results on table 1 show mean values for anthropometric parameters by age group while data on table 2 show mean values for physical abilities. Table no. 3 shows the anthropometric differences between the age groups and the respective positions in the field while table 4 and 5 show values for physical abilities by age group and respective positions to the field. Comparison for table 3,4,5 are used symbols for data comparison- U13 vs U15** $p<0.001$, U13 vs U15* $p<0.005$; U15 vs U17 ᵝᵝ $p<0.001$, U15 vs U17 ᵝ $p<0.005$; U17 vs U19 ᶜᶜ $p<0.001$, U17 vs U19 ᶜ $p<0.005$; U19 vs U21 ®® $p<0.001$, U19 vs U21 ® $p<0.005$.

Table 1

Age Category/ BOYS	U13		U15		U17		U19		U21	
	Mean	. Deviat	Mean	. Deviat	Mean	. Deviat	Mean	. Deviat	Mean	. Devia
Body_Height_cm	152.4	7.7	171.9	8.7	173.5	5.5	177.2	5.9	178.4	4.8
Body_Weight	42.8	5.5	58.8	9.3	64.9	6.0	72.3	6.7	72.1	7.0
BMI	18.4	2.0	19.8	1.7	21.6	1.7	23.0	1.2	22.6	1.8
Waist_Circumference	68.4	5.1	74.9	5.8	75.7	4.5	81.2	3.5	79.5	4.8

Table 2

Age Category/ BOYS	U13		U15		U17		U19		U21	
	Mean	. Deviat	Mean	. Deviat	Mean	. Deviat	Mean	. Deviat	Mean	. Deviati
Aerobic_Fitness_20m_Shuttle_Total_laps			88.2	11.2	86.0	9.3	84.5	14.2	76.1	18.5
Upper_Body_Push_ups_30s	22.5	17.1			26.8	6.4	39.3	10.3	32.0	7.2
Core_Body_Curl_up_30s	21.8	3.2			25.5	3.6	31.2	3.2	26.1	2.5
Lower_Body_Standing_Long_Jump	168.2	14.2	211.9	26.3	229.6	17.1	224.7	15.0	243.1	13.3
Jump_CMJ_cm	33.4	7.3	47.9	7.6	51.5	5.0	49.1	5.5	53.6	5.5
Jump_with_steps_cm	39.6	9.1	53.5	9.2	59.0	5.8	55.2	4.6	62.2	5.2
Flexibility_Sit_and_Reach	22.5	5.4	19.7	4.3	30.5	6.9	31.4	5.8	25.9	8.0
Speed_Sprint_10m	2.18	0.12	1.9	0.1	1.9	0.2	1.9	0.2	1.25	0.05
Speed_Sprint_20m	3.79	0.22	3.3	0.1	3.3	0.2	3.2	0.1	3.26	0.21
Agility_10x5m	20.9	1.1	17.4	0.6	18.8	1.0	17.7	1.3	17.1	1.0
T_test	14.1	3.9	11.2	0.5	11.5	1.8	10.8	0.4	10.8	0.4

Table 3

Position	Age Category/ BOYS	U13	U15	U17	U19	U21
		Mean	Mean	Mean	Mean	Mean
Goal Keaper	Body_Height_cm	165**	177ᵚ	179ᶜᶜ	188.5ᵒᵒ	179.1
	Body_Weight	46**	57.7ᵚᵚ	68ᶜᶜ	82.2ᵒᵒ	73.5
	BMI	16.9**	18.4ᵚᵚ	21.2ᶜᶜ	23.1ᵒᵒ	22.9
	Waist_Circumference	70**	73.0	73ᶜᶜ	86ᵒᵒ	80.3
	Body_fat_percentage_Triceps_Calf			13.6ᶜ	14.1ᵒᵒ	13.2
Defender	Body_Height_cm	150.7**	169.6ᵚᵚ	176.9	177.9ᵒᵒ	180.6
	Body_Weight	46.9**	56.8ᵚᵚ	67.6ᶜᶜ	72.9ᵒᵒ	77.4
	BMI	20.6	19.6ᵚᵚ	21.6ᶜᶜ	23.1ᵒᵒ	23.7
	Waist_Circumference	73.0	73.1ᵚᵚ	77.2ᶜᶜ	83.3	84.0
	Body_fat_percentage_Triceps_Calf			11.4	10.8ᵒᵒ	20.0
Midfielder	Body_Height_cm	152.8**	165.2ᵚᵚ	169.4ᶜᶜ	174.8ᵒᵒ	181.8
	Body_Weight	41.6**	52.1ᵚᵚ	60.1ᶜᶜ	68.2ᵒᵒ	73.2
	BMI	17.8**	19.1ᵚᵚ	20.9ᶜᶜ	22.3ᵒᵒ	22.2
	Waist_Circumference	66.5**	71.6ᵚᵚ	73.7ᶜᶜ	79.1ᵒᵒ	81.0
	Body_fat_percentage_Triceps_Calf			11.9	11.4ᵒᵒ	10.5
Attacker	Body_Height_cm	151.1**	174.2	174.1ᶜᶜ	177.4	177.1
	Body_Weight	40.5**	62.0ᵚᵚ	67.4ᶜᶜ	74.7ᵒᵒ	67.6
	BMI	17.8**	20.3ᵚᵚ	22.2ᶜ	23.7ᵒᵒ	21.6
	Waist_Circumference	67.2**	76.2	76.8ᶜᶜ	80.5ᵒᵒ	75.8
	Body_fat_percentage_Triceps_Calf			11.94ᶜ	10.3ᵒᵒ	8.6

Conclusions and discussions

Results from this study for motor abilities parameters show statistical improvement for U13 to U17 and no statistical significant difference (speed, agility, strength, aerobic fitness and jumping performance) between U19 to U21. This study research show that with increasing age there are improvement for anthropometric and motor parameters from U13 to U19 and no difference for U19 to U21 age groups in football.

In the age group U13, U15, U17, U19, the average height of goalkeepers is higher than the height of defenders, midfielders and forwards, with the exception of U21, where the average height of goalkeepers is lower than that of defenders and midfielders. At U13, the average

Table 4						
	Age Category/ BOYS	U13	U15	U17	U19	U21
Position		Mean	Mean	Mean	Mean	Mean
Goal Keeper	Aerobic_Fitness_20m_Shuttle_Total_laps		56ĸĸ	68ʕʕ	61⊚	59.0
	Upper_Body_Push_ups_30s	18		28ʕʕ	16⊚⊚	29.5
	Core_Body_Curl_up_30s	25		27ʕʕ	30⊚⊚	25.5
	Lower_Body_Standing_Long_Jump	182.9**	200ĸĸ	233.7	231.1⊚⊚	247.7
	Jump_CMJ_cm	46.3**	59.8ĸĸ	52.6ʕʕ	49.3⊚⊚	52.2
	Jump_with_steps_cm	48.8**	57.2	57.7ʕʕ	51.8⊚⊚	58.6
Defender	Aerobic_Fitness_20m_Shuttle_Total_laps		90.4ĸĸ	82.3ʕ	83.8⊚⊚	69.7
	Upper_Body_Push_ups_30s	12.2		27.7ʕʕ	39.2⊚⊚	33.3
	Core_Body_Curl_up_30s	20.4		23.4ʕʕ	29.8⊚⊚	24.7
	Lower_Body_Standing_Long_Jump	163.6**	207.2ĸĸ	237.7ʕʕ	227.8⊚⊚	242.1
	Jump_CMJ_cm	29.1**	42.7ĸĸ	52.2ʕ	50.6⊚⊚	52.9
	Jump_with_steps_cm	34.8**	48.8ĸĸ	59.1ʕ	57.4⊚⊚	63.9
Midfielder	Aerobic_Fitness_20m_Shuttle_Total_laps		91.0	91.4ʕʕ	94⊚⊚	81.0
	Upper_Body_Push_ups_30s	29.7		28.3ʕʕ	38.2⊚⊚	33.7
	Core_Body_Curl_up_30s	23.4		26.3ʕʕ	31.4⊚⊚	27.0
	Lower_Body_Standing_Long_Jump	172.7**	221.0	221.6	221.5⊚⊚	242.2
	Jump_CMJ_cm	36.1**	51ĸ	49.5ʕ	48.1⊚	49.7
	Jump_with_steps_cm	43.4**	57.3	57.5ʕ	54.2⊚⊚	61.1
Attacker	Aerobic_Fitness_20m_Shuttle_Total_laps		85.8	86.3ʕʕ	80.6⊚⊚	95.0
	Upper_Body_Push_ups_30s	21.0		23ʕʕ	45.2⊚⊚	23.0
	Core_Body_Curl_up_30s	20.0		26.4ʕʕ	32.8⊚⊚	28.0
	Lower_Body_Standing_Long_Jump	163**	202.4ĸĸ	230.1ʕʕ	223.0⊚⊚	245.1
	Jump_CMJ_cm	31**	47ĸĸ	52.8ʕ	48.2⊚⊚	56.2
	Jump_with_steps_cm	36.2**	52.6ĸĸ	60.8ʕʕ	54.3⊚⊚	68.9

Table 5

Position	Age Category/ BOYS	U13 Mean	U15 Mean	U17 Mean	U19 Mean	U21 Mean
Goal Keeper	Flexibility_Sit_and_Reach	35**	19ᵇᵇ	37ᶜᶜ	22.5®®	28.0
	Speed_Sprint_10m	2.07**	1.84ᵇᵇ	2.1ᶜ	1.97®®	1.31
	Speed_Sprint_20m	3.65**	3.36ᵇᵇ	3.56ᶜᶜ	3.29®®	3.59
	Agility_10x5m	21.27**	17.31ᵇ	18.19	18.63®®	18.0
	T_test	14**	10.82ᵇ	11.46ᶜ	10.75	10.9
Defender	Flexibility_Sit_and_Reach	18.1**	20.2ᵇᵇ	29.1ᶜᶜ	31.8®®	25.3
	Speed_Sprint_10m	2.3**	2.0ᵇ	1.8ᶜ	2.0®®	1.25
	Speed_Sprint_20m	4.0**	3.40	3.30	3.2®	3.32
	Agility_10x5m	21.8**	17.3ᵇ	18.9	18.1	17.7
	T_test	14.6**	11.5	11.1	10.6	11.1
Midfielder	Flexibility_Sit_and_Reach	23.5**	19.2ᵇᵇ	33.3	33.8®®	22.0
	Speed_Sprint_10m	2.2**	1.90	1.90	1.9®®	1.22
	Speed_Sprint_20m	3.7**	3.30	3.30	3.20	3.27
	Agility_10x5m	20.2**	17.5ᵇᵇ	19.2ᶜᶜ	17.1	16.5
	T_test	12.4*	11.2ᵇ	12.3ᶜᶜ	10.8	10.1
Attacker	Flexibility_Sit_and_Reach	22.4**	18.8ᵇᵇ	27.8ᶜᶜ	30.3®	31.5
	Speed_Sprint_10m	2.20	2.00	2.00	1.9®	1.27
	Speed_Sprint_20m	3.8*	3.30	3.20	3.10	3.16
	Agility_10x5m	21.0**	17.4ᵇ	18.1	17.6	16.9
	T_test	16.2**	11.0	11.1	10.9	10.9

weight of goalkeepers and defenders has a negligible difference, while midfielders and forwards have a difference of 4-6 kg less than defenders and goalkeepers. In U15 goalkeepers and defenders have very little difference, midfielders have a relatively lighter weight of 4-5 kg while forwards have a weight of 62.0 kg. In U17 goalkeepers, defenders and attackers are in weights close to these data, respectively, 68.0, 67.6, and 67.4. While midfielders have a lower average weight of around 60.1 kg. The 20m shuttle test that we conducted at U15, U17, U19, U21 gave us these results. At U15 we have the best performance with an average of 88.2 laps. In U17 the average is 86 laps, in U19 the average is 84.5 laps and in U21 we have an average of 76.1 laps. Among these results, we would emphasize the 10 m and 20 m speed tests. For U13, we have the following data: for 10m sprint, the average is 2.18 sec, while for 20m, 3.79 sec. For U15 for 10m sprint time is 1.9 sec and for 20m 3.3 sec, for U17 for 10m sprint time is 1.9

sec and for 20m 3.3 sec. While for U19 the time for 10m is 1.9k and for 20m 3.2 sec and. for U21 the time for 20m is 3.26 seconds. Heart rate at rest, systolic and diastolic blood pressure. From the measurements performed, all the athletes were in good condition and ready to perform the physical tests.

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