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Anthropometric Characteristics and Physical Performance of Young Elite Kosovo Soccer Players

Características Antropométricas y Rendimiento Físico de Jóvenes Futbolistas de Élite de Kosovo

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SUMMARY: The aim of this study was to establish the anthropometric and physical profiles of young soccer players according to their playing position and to determine their relevance for competition success. One hundred and twenty young soccer players participated in the study. Players aged 19 were classified into the following groups: defenders (n=40), midfielders (n=40) and attackers (n=40). The anthropometric variables of participants (height, weight, body mass index, 4 skinfold, 2 diameters, and 2 perimeters) were measured. Also, their somatotype and body composition were calculated. Participants performed Bruce treadmill test protocol and Yo-Yo Intermittent Test to estimate their relative VO_2max, sprint tests (5 m and 20 m flat), 2 jump tests (countermovement jump and standing long jump test), 3 tests for assessing agility (Illinois with balls and without balls, and 505-test) and seven fitness tests for assessing power, speed, agility, flexibility, frequency, abdominal muscle power and balance. Analysis of variance (ANOVA) was used to determinate differences between team positions. On the base of the obtained results, it can be established that players playing in midfield position have less body height, weight, and achieve less results in fitness tests Illinois 20-meter running, leg-tapping, sit-ups in 30 seconds, but better results in the tests 'sit and reach', 'flamingo' and the tests of assessing maximum oxygen consumption compared to the defenders and attackers. The attack players have less values in skinfolds and achieve better results in 5-meter running test and standing long jump compared to the midfielders and defenders. The obtained results can serve as normative morphologic-functional indexes for regular medical control of young footballers in the R. Kosovo. They can also be used as a model of comparison of morphologic- functional data between young footballers of similar levels in different countries.

KEY WORDS: Fitness tests; Yo-Yo Intermittent Test; Sprint tests; Jump tests.

INTRODUCTION

In modern life more and more persons join football games both at amateur and professional levels. The number of countries participating in international competitions has rapidly increased for the past thirty years, and score results of some once considered, second-grade football nations, are improving steadily. Training capacity and quality, as well as the range of coaching methods, are also making fast progress.. Unlike the football of the forties, in the last century when the amateur sports manner predominated, modern champions are supported by massive teams of managers and various types of specialists and scientists (Bangsbo, 1994a).

Morphologic characteristics (Bangsbo, 1994b; Reilly *et al.*, 2000) and physical, technical and tactical skills (Di Salvo *et al.*, 2007; Rampinini *et al.*, 2007) make successful distinction between football players by competitive level and field position. The studies prevailing hitherto suggest that young elite players are taller and heavier compared to non-elite of the same age (Malina *et al.*, 2000, 2004; Figueiredo *et al.*, 2009), and perform significantly better on jumping and sprinting tests (Gissis *et al.*, 2006; Gravina *et al.*, 2008) as well as in soccer-specific tests of shooting accuracy, dribbling and juggling (Vaeyens *et al.*, 2006). Soccer players are categorized into four groups: goalkeeper, defenders, midfielders and attackers. Therefore, players in the various positions have different position-specific performance and anthropometric characteristics required for success. Goalkeepers and defenders are taller and heavier than those

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playing other positions in the team (Malina *et al*., 2004; Gil *et al*., 2007a; Wong *et al*., 2009), but they do not differ in passing, dribbling and shooting accuracy (Malina *et al*., 2005), as well as in sprinting, shooting power and intermittent endurance (Wong *et al*.). Central defenders and forwards perform better in vertical jump compared to midfielders (Rampinini *et al*.).

A greater deal of the former researches have mostly studied players aged from 11 to 16 years - the period when individual differences of growing and physical maturity are most obvious (le Gall *et al*., 2010), and this might skew prediction of success in adolescent soccer players. On the other hand, there are considerably less amount of information about older or late adolescent players aged 17-19 years (under 19, U19), which is the final-age group before players face the challenges of the highest competitive levels of that kind of sport. Former researches suggest that > 70 % of professional football players started their career at the age between 17 and 20 years (Poli & Ravenel, 2008), and due to it young players of that particular age-phase development are expected to be ready for competing on top levels, and also to perfect themselves in the team-position they are going to play.

Though football is the most popular sport in the Republic of Kosovo, there are very few researches studying physical performance and anthropometric characteristics with top young players in that country (Gjonbalaj *et al*., 2018). It is, most probably, due to the fact the Kosovo Football Federation becomes a member of FIFA and UEFA in 2016 year.

Having in mind that the process of developing perfection starts at early age, the comprehension of physical performance and anthropometric characteristics of each team-position is of a major importance for the coaches, sports physicians and scientists. The goal of the present study is to establish physical performance and anthropometric characteristics in soccer players who play in the junior super league in Kosovo and determination of possible differences in the monitored characteristics related to the position which the player takes in the game.

MATERIAL AND METHOD

Subject: The research was conducted on a sample of 120 young football players aged 19, who play in the top clubs of Kosovo Junior super league (U19) and have at least 5 years of sports practice. The 19-year-old footballers are divided into three groups: defenders (n=40), midfielders (n=40) and attackers (n=40). Before starting the measurements according to the Declaration of Helsinki respondents were informed of the research goals and possible injury risks. Any participation in the research was to be discontinued, providing that a health problem was reported by a respondent.

Study Protocol

Anthropometry, Somatotype and Body Composition: The height (cm) and weight (kg) of each player were measured, and the BMI was calculated as weight (in kg) divided by height (in m^2). Skinfolds (mm) were measured at 4 sites: triceps, supraspinale and calf skinfold, using a skinfold caliper (John Bull calipers). Each individual measurement and the sum of the 4 measurements were used for analysis. The perimeters of the upper arm and lower leg were measured (cm); also measured were the following 2 diameters (cm): biepicondylar femur (knee) and biepicondylar humerus (elbow). All the measurements were made following the guidelines outlined by the International Society for the Advancement of Kinanthropometry. Percentages of fat calculated using the formulas of (Shephard, 1999). The endomorphy, mesomorphy, and ectomorphy components of the somatotype were also calculated (Heath & Carter, 1967).

Psychological Tests: Maximum oxygen consumption is measured by a standard treadmill exercise testing according to Bruce protocol, which is a sub-maximal treadmill test. Bruce test consists of multiple stages of progressively increasing workloads, which should be performed until the examinee reaches his sub-maximal heart rate. The test includes 7 stages, each lasting for 3 minutes and with each subsequent stage the speed and the inclination of the track is significantly increased. VO$_2$max is calculated from the Bruce nomogram using the exercise time (ET - duration of the test expressed in minutes) and the sex of the examinee.

Vertical jump height and power were measured using a force platform (Quattro Jump, Kistler Switzerland Paren Co.). The types of test used were the countermovement jump (CMJ). Players had 2 preparatory measurements. An average of the 3 measurements was used to represent the result in the CMJ. Horizontal power (maximum horizontal distance) were measured using Standing Broad Jump Test. The distance jumped was measured in centimeters. Sprints over 5 and 20 meters (SP5 and SP20) were measured using a photocell system (Brower), and an average value from the 3 sprint attempts was taken as the final result. Flexibility was measured using the sit and-reach test. The total displacement of the fingertips between reach and stretch distance was recorded to the nearest 0.5 cm, and the best of three trials was accepted as the final score (Clark, 2007). Strength with abdominal muscles core was measured using the Sit Ups

Test (the athlete to perform as many sit-ups as possible in 30 seconds). Agility was measured using the 505 Agility test, Illinois Test without a ball and Illinois Test with a ball and the best times of three successful trials (to the nearest 0.1 s) were recorded. General balance was measured using the flamingo balance test. Coordination and speed of limb movement was measured using the leg-tapping test. Specific endurance was measured using Yo-Yo intermittent endurance test – level 2 (Yo-Yo IE2). The aim of the test was to perform as many shuttles as possible. When the player failed twice to reach the finish line in time, the distance covered was recorded and used as the test result. Only 1 trial was give (Bangsbo *et al.*, 2008).

The research was completed in the National Centre of Sport Medicine (NCSM) in Prishtina, where all active athletes of Kosovo are obliged to undergo a regular medico-sports examination. Measurements were conducted in February, 2017 year, when football players have their compulsory medical check.

Statistical Methods: The players' anthropometric and performance characteristics were analysed descriptively (i.e. mean and standard deviations). In addition, a one-way analysis of variance (ANOVA) was undertaken to evaluate the differences in the dependent measures based on playing positions. If the result was significant, Tukey HSD post hoc analysis was carried out to determine specific substantial differences among the groups. A probability level of 0.05 or less was taken to indicate statistical significance. All data were analyzed using the Statistical Package for the Social Sciences (SPSS) (SPSS Inc., Chicago, IL, USA, version 22.0).

RESULTS

Tables I and II shows the physical and anthropometric characteristics of the male soccer players. The analysis results show that all the applied variables are normally distributed (the data is not presented).

Statistical differences between the groups in anthropometric measures and somatotype components (Table I) between players in different game position are established in the variables: Height (F=29.77; p=.000), Weight (F=5.20; p=.007), BMI (F= 3.75; p=.026), Femoris breadth (F= 7.73; p=.001), Humeral breadth (F= 3.74; p=.027), Triceps skinfold (F= 6.63; p=.007), Subscapular skinfold (F= 6.12; p=.003), Supraspinale skinfold (F= 6.13; p=.003), Calf skinfold (F= 4.47; p=.011), Suma skinfold (F= 5.79; p=.004), Body fat (F= 7.19; p=.001), Endomorphy (F= 7.19; p=.001), Mesomorphy (F= 5.01; p=.008) and Ectomorphy (F= 6.13; p=.000).

The review of Table II show that statistically significant differences between the players in different game positions within the team are established in all the applied variables of assessing physical performance (except for the variable countermovement jump - CMJ) on a level of <0.05.

DISCUSSION

The results of the study presented that the average body height of Kosovo football players (U19) is 178 cm, and the body mass – 69 kg. Various researches show that

Table I. Anthropometric characteristics of elite young Kosovo soccer players.

	Defenders		Midfielders		Attackers		Total		F	Sig
	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Height	1.80	0.05	1.73	0.05	1.81	0.05	1.78	0.06	29.77	.000
Weight	72.08	7.23	66.86	7.78	69.24	6.66	69.39	7.49	5.20	.007
BMI	22.20	1.89	22.29	2.40	21.17	1.79	21.89	2.09	3.75	.026
Biceps girth	274.13	24.00	270.53	27.76	270.00	19.26	271.55	23.80	0.35	.704
Calf girth	365.78	17.85	359.48	24.92	356.13	18.12	360.46	20.78	2.27	.108
Femoris breadth	98.10	3.64	94.48	3.73	96.25	4.88	96.28	4.35	7.73	.001
Humeral breadth	69.33	3.63	67.08	3.67	68.75	4.15	68.38	3.91	3.74	.027
Triceps skinfold	84.45	30.89	93.90	36.20	69.95	19.26	82.77	31.01	6.63	.002
Subscapular skinfold	84.50	20.93	89.85	35.58	71.05	11.64	81.80	25.80	6.12	.003
Supraspinale skinfold	96.85	37.50	101.90	46.82	75.00	20.11	91.25	38.07	6.13	.003
Calf skinfold	90.30	39.32	99.10	44.21	73.90	25.35	87.77	38.31	4.74	.011
Suma skinfold	89.03	28.77	96.19	38.53	72.48	16.17	85.90	30.71	6.90	.001
Body fat	12.85	2.66	13.30	3.34	11.29	2.17	12.48	2.88	5.79	.004
Endomorphy	2.65	0.88	2.84	1.17	2.11	0.52	2.53	0.94	7.19	.001
Mesomorphy	3.47	1.04	3.79	1.12	3.05	0.99	3.43	1.09	5.01	.008
Ectomorphy	3.17	0.92	2.76	1.13	3.72	0.98	3.21	1.08	9.06	.000

Table II. Physical performance of elite young Kosovo soccer players.

	Defenders		Midfielders		Attackers		Total		F	Sig
	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
VO₂max	50.36	4.25	55.42	5.53	51.44	4.91	52.40	5.35	11.71	.000
Leg-tapping test	21.78	3.37	23.30	3.02	24.48	2.75	23.18	3.23	7.83	.001
Sit Ups Test	30.08	3.60	27.33	3.78	29.63	4.10	29.01	3.99	5.93	.004
Flamingo balance test	10.35	2.63	7.83	2.70	9.33	2.96	9.17	2.93	8.43	.000
Sit and-reach test	36.35	10.31	41.75	6.35	36.98	7.71	38.36	8.57	5.08	.008
Sprints 5 m	1.30	0.13	1.40	0.14	1.21	0.11	1.30	0.15	24.07	.000
Sprints 20 m	3.31	0.13	3.39	0.15	3.25	0.12	3.31	0.15	11.49	.000
Countermovement jump	36.15	3.57	34.25	3.88	35.24	3.98	35.21	3.86	2.49	.087
Standing broad jump	218.38	14.52	212.25	13.49	225.20	15.31	218.61	15.29	8.03	.001
Illinois without a ball	14.98	0.78	15.75	0.76	15.28	0.61	15.34	0.78	11.40	.000
Illinois with a ball	20.17	1.21	19.71	0.96	20.52	1.36	20.13	1.22	4.63	.012
505 Agility test	2.50	0.15	2.57	0.16	2.45	0.14	2.51	0.16	6.40	.002
Yo-Yo endurance test	709.00	60.08	828.00	106.87	719.00	72.18	752.00	97.79	25.83	.000

football players taking part in competitions of national and international rank vary in their body mass, height and BMI index, depending on the geographical location, ethnical and cultural influences, or the different style of football playing, diets etc. Professional and / or top football players in Europe, the Middle East and South America have an approximate body height varying from 176.0 – 183.0 cm, and body weight generally less than 80 kg (within the span of 65.6 – 78.7 kg), and BMI index varying between 23.00 – 24.45 kg/m².

Comparing the body height of the players in different game position of the team, it should be noted that midfielders have less body height compared to defenders and forwards. Some former researches also establish that the height can have an impact on the game position of the football player in the team, so the higher players are mostly placed as goalkeepers and in the defense, where the height is advantage (Bangsbo, 1994a,b; Reilly *et al*.; Matkovic *et al*., 2003). Similar results are obtained in the research of Matkovic´ *et al*., who established that Croatian goalkeepers are the highest and heaviest, and have longer hands and legs. Comparing the body weight of players in different team positions, it is obvious that those playing in defense show greatest values of body height, then come the forwards, while the lowest body weight values showthe midfielders.

Body composition is also a significant factor contributing substantially to the success in that sport. Ave-rage fat component values in Kosovo footballers is about 11.6 % and is within the values' frame of the first Brasilia league (10.9 %), Portugal players (10.5 %) and English players (12.4 %) according to Matkovic´ *et al*. Footballers playing forwards have less values of the subscapular skinfold, the skinfold stomach, the calf skinfold and thigh skinfold compared to the players of defense and midfielders.

In the present research Kosovo footballers show ecto mesomorph somatotype (2.5-3.3-3.2), with which they are partially behind somatotype characteristics of elite players from other countries. Somatotype of Portugal First League is 2.8-5.6-2.2 (Casajús, 2001); and the mesomorph component results obtained in the present study were higher with the Spanish National Team (1990 World Cup) 2.2-5.1-1.9 (Casajús & Aragonés, 1991), with top Hungary players 2.1-5.1-2.3 and with top players from South America 2.2-5.4-2.2 (Rienzi *et al*., 2000).

The maximum oxygen consumption values with Kosovo young footballers range about 53 ml/min/kg. Comparing the maximum oxygen consumption of Kosovo young footballers to the results of international studies; Kosovo athletes are placed at the bottom of the scale with that parameter. Namely, Norwegian footballers of the First League have maximum oxygen consumption at level of around 62 ml/min/kg, New Zealand – around 61 ml/min/kg, Australian – around 60 ml/min/kg, Croatian – 60 ml/min/kg, English – around 60 ml/min/kg, Hong Kong – 59 ml/min/kg, from USA – 58 ml/min/kg, and top Brazilian footballers – 52 mi/min/kg (Sporis *et al*., 2009). From these statistics it can be inferred that the aerobic abilities of Kosovo footballers are inferior to the other athletes. It is one of the reasons for the lower success rates for Kosovo players in international competitions, wherein the opponent has a well-trained team. The above, emphasizes the task required for professional team coaches, to develop that major parameter by adopting modern training technologies and techniques. On the other hand, the case of Brazilian

First League footballers illustrates that the considered parameter, though significant in the game of football, is not crucial to gaining success in elite football. The team of lesser aerobic abilities can compensate for that lack, by modifying the paly-style, but it would require some others potentials (anaerobic parameters, strategy, tactics, techniques) to make a top rank progress. Reilly *et al*. suggest a particular level of VO_2max (60 ml/min/kg), where the cases of values lower than that limit are to be interpreted as a mark of absence of physical attributes, required for achieving success in elite football. In addition, VO2max varies depending on the role and position of the player. A certain number of researches do not establish differences in the relative maximum oxygen consumption in relation to the game-position. The authors suggest that similarities in connection with VO_2max noticed between players of different positions, can be the result of modern football demands, greater mobile activities of the attackers and defenders. The present research determines that the players of midfield position have greater VO_2max values than those playing in defense and forward. There are no statistically significant differences in VO_2max between the defenders and forwards.

The ground test Yo-Yo, which assesses specific endurance, also provides similar results as with the laboratory test of assessing VO_2max.The midfielders have statistically higher values in Yo-Yo test compared to those playing defence and attacker. There are no statistically significant differences in Yo-Yo test between the defenders and forwarders. Bradley *et al*. (2011) determined a high correlation between the result obtained in Yo-Yo test (it assesses specific endurance and the distance run through with high intensity) and the total of the run-through distance during the competition. Bangsbo *et al*. established in their study, that the abilities in Yo-Yo interval test grow with the years of young athletes. The results of the research demonstrate that the best specific endurance between the groups of players keeping different game positions have those of the midfield, achieving test results of 828±106 m, followed by the attackers with 719±72 m, and finally – the defenders with test results of 709±60 m. All the players' groups in that research had values lower than those recommended by Veineck (2007). The presented suggests that average values obtained from the test should be 1059 m for professional players of international rank. According to Bunc's research (Bunc, 1999) the results achieved by young Kosovo players are not on a satisfactory level for the whole group.

Ability of a short-distance acceleration is a very important characteristic of the footballer. It is recorded that 96 % of sprints in a match are accomplished on a less than 30 m track, 49 % of which, are on less than 10 m (Valker *et al*., 1998). The study results present that attackers achieve better results in the 5-meter-running test compared to those playing in the midfield and defense. Also, significant differences are determined between the defenders and midfielders. As well, the 20-meter-running test determined differences between the attackers and midfielders, and between defenders and midfielders, whereas statistically significant differences were not determined between the players of forward and defense positions. Comparing the results of speed assessing tests with some other researches, it can be concluded that footballers in the present study have results similar to players from Croatia, Belgium, Norway and England. Sporis *et al*. studied top Croatian footballers in seasons 2005/06 and 2006/07 and established that the defenders showed the best results in sprints on 5, 10 and 20 m. Boone *et al*. (2012) studied top Belgium footballers and established that forwarders achieved better results in the tests assessing speed on 5 and 5 to 10 m compared to the midfielders (players of connection), defenders and the goalkeepers; also, the defenders were faster than midfielders and goalkeepers. Contrary to the results of the present research, the study conducted by Pivovarnicek *et al*. (2013) on the Slovac National Football team of players under 21 years established that the midfielders (players of connection) achieved the best time result in sprint abilities.

In the present research for assessing legs' explosive power, there were applied the tests of counter movement jump and standing long jump. The study results show that there are no established statistically significant differences in the results of countermovement jump test between the defenders, midfielders and forwarders. With the standing long jump test the best results are achieved by the forwarders, followed by the defenders, whereas the lowest results are with the midfielders. The whole sample of Kosovo young footballers achieve lower results in the countermovement jump test compared to top adult players (~9.6 cm, respectively) (Ozçakar *et al*., 2003). The research of Sporis *et al*. determines that the forwarders have the highest level of explosive abilities, compared to all other players in the playfield. Boone *et al*. established that with the adult players from six teams in Belgian Pro League the goalkeepers and central defenders achieved the best results in vertical jumps compared to the group of defense players, players of connection and forwarders, which corresponds with the results of Lago-Peñas *et al*. (2011). Haugen *et al*. (2013) studied Norwegian players, covering the senior and junior National Team within the period from 1995 to 2010, and established that the vertical jump tests show lower results with the group of midfield players compared to the other groups divided according to the game position in the team. As for the game requirements, the high level of explosive abilities stands as an advantage in individual duels in the air, but also in running, which is confirmed in the researches

of Wisløff *et al.* (2004), where the significant correlation is confirmed between 10 and 30-meter fast run and vertical jumps with top footballers of international rank.

Soccer players continuously change the direction of movement and body position during a match (Clark). The study results present that players of midfield position achieve lower results in the "Illinois" assessment test, without a ball compared to those playing in defense and forward position, but the best results are seen in the same test, when it is performed with a ball. With the test agility 505 the midfield players achieve statistically significantly lower results than the players in the forward position. Between the players in defense and attackers, and between defense and midfield statistically significant differences are not determined in the agility 505 test. According to Boone *et al.*, forwarders demonstrated better agility than goalkeepers, defenders and midfielders. Taskin (2008) established similar results in agility between the players keeping different game positions in the team. Gil *et al.* (2007b) studied abilities of young footballers aged from 14 to 21 years. The research results showed that the forwards players had the best agility. Young Kosovo players achieved lower results in Illinois agility run compared to English First Division soccer players taken in the season period (August-September) of the 2001/2002 years, who recorded an average time of 14.62 s for the first team, and 14.76 s for the reserves (Dunbar & Treasure, 2005).

Flexibility is the ability that provides free amplitude of joint movement. Though the joint flexibility depends on more factors. One of the most important is the stretch of muscles covering the joint. Football does not require extremely developed flexibility of body joints. In football the optimum developed flexibility of joints of hamstrings, knees, feet and the lower part of the spine is more important. The flexibility of the hamstrings is an important measure and as has been repeatedly shown, in 70-80 % of all soccer injuries, these occur in the lower extremities (Albert, 1983; Ekstrand & Gillquist, 1983). The research results show that the best results with the 'sit and reach' test for assessing flexibility are achieved by players of the midfield position, whereas for those playing in defense and offense, statistically significant differences with that particular test, were not determined. Our players had similar sit-and-reach measures to that reported previously by Mercer *et al.* (1997).

Balance is an ability of controlling stable body positioning when standing and moving. In other words, it is the ability of making and keeping condition of balance of body mass. In football balance is important for successful control of the ball and change of the direction in tricky situations. Also, balance plays an important role in preventing injuries of players, particularly those of the foot and knee.

In reference to the data, it can be established that the best results in 'flamingo' test, which assesses static balance, show the players of midfield position, whereas between the defenders and forwards are not determined statistically significant differences in the 'flamingo' test.

Motor ability 'frequency of movements' is defined as the ability of performing movements of constant amplitude and maximum frequency, and it is most relevant while performing actions in both directions as fast as possible (i.e. performing a kick and getting back in initial position) and ability of repeating same movements. Based on the data obtained, it can be stated that players in defense positions achieve statistically lower values in the leg-tapping test than those of midfield and forward positions. Statistically significant differences in leg-tapping test are not determined between midfielders and forwarders.

The tors function is significant since it is considered as a 'platform' that must be stable. The tors is chief body part of the athlete. It includes the center of body weight and is responsible for the control of all powers produced by the upper and lower extremities. If stable, it provides with control external and internal powers influencing the athlete, which provides correct and explosive movements. The study results suggest that the players of midfield position achieve lower results in sit-up test for thirty seconds than those playing in defense and offense. There is no difference in test results of 30-second sit-ups between the defenders and forwarders.

In addition, some disadvantages of the research need to be mentioned. Assessment of speed and explosiveness in situations isolated from real game are just a pre-condition, because the game skills in footballers are influenced by varying specific situations and demands within the game. Specific movement skills, manifest through variations of frequency, length of pace and shifting run direction, while the player is forced to constantly adapt his movement on the ground-field according to the perception of the arising conditions. Collaboration with team mates is important, for example the perception of the opponent player and accomplishment of sprint with the ball. Also, in kicking the player has to adapt the sprint technique before the kick. All these reasons should be taken into consideration when constructing specific ground-field tests in future that would be valid in assessing sprint and explosive movements, and they would be relevant to compare with the tests applied in the present research.

In spite of the mentioned limitations, the study can be an inspiration for condition and sports coaches of football teams to find and eliminate faults of their young players, especially in the conditional training within the preparatory

period and the individual training with regard to the diagnostic results in the course of the training circle round the year. Coaches need to possess a good knowledge of the general and specific tasks that the player has to perform in the game. In football it is strongly recommended that for some positions the players be selected with regard to compatibility of their morphologic-functional characteristics for the meant game position.

CONCLUSIONS

On the base of obtained data a conclusion can be drawn that the midfield players have less body height, weight and achieve lower results in the Illinois fitness test, 20-meter running, leg-tapping, in 30 seconds sit-ups, but better results in tests 'sit and reach', 'flamingo' and those of assessing maximum oxygen consumption compared to the players of defense and offense. The forwarders have less skinfold values, achieve better results in 5-meter running test and standing long jump compared to the players of the midfield and defense position.

The data presented here can also serve as certain norms and standards for top young footballers from the point of movement abilities. The research results are valuable material for scientists as well as coaches, professionals and persons interested in football. When selecting talented players, it must be kept in mind that football is one of the most popular sports worldwide. Tests are used for assessing physical and motoric performances, along with anthropometric and somatotype research, and growth and development control of athletes.

SYLEJMANI, B.; MALIQI, A.; GONTAREV, S.; HAZIRI, S.; MORINA, B.; DURMISHAJ, E. & BAJRAMI, A. Características antropométricas y rendimiento físico de jóvenes futbolistas de élite de Kosovo. *Int. J. Morphol., 37(4)*:1429-1436, 2019.

RESUMEN: El objetivo de este estudio fue establecer los perfiles antropométricos y físicos de jóvenes futbolistas de acuerdo con su posición de juego y determinar su relevancia para el éxito de la competencia. Ciento veinte jóvenes futbolistas participaron en el estudio. Jugadores de 19 años de edad fueron clasificados en los siguientes grupos: defensores (n = 40), mediocampistas (n = 40) y atacantes (n = 40). Se midieron las variables antropométricas de los participantes (altura, peso, índice de masa corporal, 4 pliegues cutáneos, 2 diámetros y 2 perímetros). Además, se calculó su somatotipo y composición corporal. Los participantes realizaron el protocolo de prueba de cinta de andar de Bruce y la prueba intermitente Yo-Yo para estimar su VO$_2$ máx. relativo, pruebas de velocidad (5 m y 20 m planos), 2 pruebas de salto (contraataque y prueba de salto de pie), 3 pruebas para eva-luar la agilidad (Illinois con balones y sin balones, y 505-test) y siete pruebas de condición física para evaluar la potencia, la velocidad, la agilidad, la flexibilidad, la frecuencia, la potencia de los músculos abdominales y el equilibrio. El análisis de varianza (ANOVA) se utilizó para determinar las diferencias entre las posiciones del equipo. Sobre la base de los resultados obtenidos, se puede establecer que los jugadores que juegan en la posición del medio campo tienen menos altura corporal, peso y logran menos resultados en las pruebas de condición física, en comparación con los defensores y atacantes: carrera de 20 metros de Illinois, golpeo de piernas, abdominales en 30 segundos, pero mejores resultados en las pruebas 'sentarse y alcanzar', 'flamingo' y las pruebas de evaluar el consumo máximo de oxígeno. Los jugadores de ataque tienen menos valores en los pliegues cutáneos y logran mejores resultados en una prueba de carrera de 5 metros y en salto largo, en comparación con los centrocampistas y defensores. Los resultados obtenidos pueden servir como índices morfológicos-funcionales normativos para el control médico regular de los jóvenes futbolistas en Kosovo. También pueden usarse como un modelo de comparación de datos morfológico-funcionales entre jóvenes futbolistas de niveles similares en diferentes países.

PALABRAS CLAVE: Pruebas de condición física; Prueba intermitente de Yo-Yo; Pruebas de velocidad; Pruebas de salto.

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