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Research Article

Anthropometric and Physical Data of Children in Football

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Abstract

Football is one of the most played and complex sports in the world, where players need technical, tactical and physical skills to succeed. Although its popularity compares to other sports at any age level, there is a lack of information on the technical, physiological and conditioning aspects of children players. Therefore, the purpose of this study was to investigate the physical, muscular performance and speed of 12-year-old football players. Eighty-two footballers who were actively participating in the Albanian Children's Championship participated in the study. Batteries for fitness testing: Standard height, body weight and calculated body mass index (BMI), speed (30m sprint), vertical jump, and rated lower body muscle strength (vertical jump) were the tests selected for to measure. Data were subjected to statistical analysis using the ANOVA method. Identifying the physical and physiological characteristics of football players provides insight into the physical and physiological qualities that are important to becoming a team member and playing successfully. The most important issue for the coach and football player is to determine the improvement of physical fitness through a well-modeled training programmer. Although anthropometric and physiological profiling is best seen as an objective tool for monitoring young player, physiological data may not be the only predictor of competitive success in football. On the other side, heritage in related physiological standards is an important prerequisite for success in football. Physiological standards play a crucial role in the selection of football talent.

Keywords: Soccer; Speed; Power; Physical characteristics; Anthropometric

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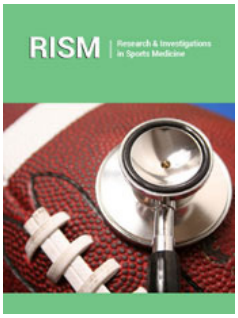

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Introduction

Football is one of the most played and complex sports in the world, where players need technical, tactical and physical skills to succeed. The game is physically demanding, requiring players to participate in frequent periods of high-intensity activity (sprinting, physical collision and interference), separated by short periods of low-intensity activity (walking and sprinting) [1,2]. There are many important factors in determining the success of a football player. Football players must adapt to the physical and physiological requirements of the game of football. Players may not need to have tremendous capacity within any of the physical performance areas, but they should have a reasonably high level within all areas. Some of these physical and physiological factors are easily measurable such as running speed and jumping capacity [3]. Football is always on the move and evolving. He finds ways to penetrate through new events by opening up great perspectives and opportunities, while football theory tries to follow and explain these events and the importance of priority factors, which positively affect the game of contemporary football. If we want to prove what success in the game of football depends on, we need to know what happens to the players during the game and what needs to be done for the success to be greater [1-3]. Numerous researches have been done in order to define the structure of motor skills, always focusing on the discovery of functional mechanisms that regulate the manifestations of motor skills. Also, numerous researches have proved important correlations between motor, physical tests and criteria in the sports results of the game of football. Every sport discipline has the structure of motor skills. The game of football requires a combination of these motor skills such as: strength, speed, endurance, flexibility, coordination, precision [2].

Sport and more specifically football is an important asset in youth lives. It is widely considered that biological maturity influences physical performance. Relationships between body size and performance are partly confounded by age. In fact, age is positively associated to strength and motor performance, even when height and weight are controlled. Studies on young footballer have been started to consider the potential impact of variation on growth and biological maturity status upon sport-specific football skills. Some authors suggest that

physical training should have a low priority until the late puberty and then the time could be devoted to other types of training such as focusing on technical aspects [4]. In addition, one of the most discriminating factors between elite and non-elite footballers was running time [1]. Assessing players' physical abilities has been widely used in an attempt to gain an understanding of player performance skills. Physiological considerations are increasingly essential for optimal performance, not only in adults but also in young children. Nowadays, early childhood participation includes intensive training and participation in sports. Although its popularity compares to other sports at any age level, there is a lack of information on the technical, physiological and conditioning aspects of players before puberty [5].

Vertical jump is a component of most sports activities, which is used as a measure of the strength of the leg muscles in football. The jumps are filogenous movements that take ontogent form in the given activity and require complex motor coordination between the cranial and the caudal segments of the athlete's body. The propulsive effect of caudal extremities during vertical jumps was considered suitable for assessing the explosive characteristics of sedentary and top athletes. Explosive power is the decisive motor skills in most sports and defines it as an ability to maximize the acceleration of one's own body, object or partner in activities of throwing, jumping, kicking and sprinting. It is essential for the players to get the necessary height of the jump during a duel game. Explosive power in the form of a vertical jump is considered extremely functional for optimal performance in football and is taken into account when testing capabilities and talent selection, as well as the identification of bilateral differences [6].

Good training program should be arranged varied to avoid saturation, reluctance and restlessness psychologically. The method of practice is the way taken in practice which is used to improve the quality of athlete in improving the prestige of the athlete. In the process of training also need good cooperation between coach and players to support the success of training process. Good characteristic of coach and player is they have good motivation in training. That means that good motivation enable each individual can work better in their group. Good performance is showed by motivation and good skill, therefore the goal set can be achieve well [7]. The agility is someone's ability to the change the direction fast and rightly when running in full of speed without balanced lost. Another definition, the agility is a skill to change the direction and position or its parts appropriately and fast. Characteristic and agility is the change of running direction, body position, direction parts of body. Someone ability in doing sport activity depends on the ability in coordinate the system of body motion by response toward the condition and situation faced and able to control sudden motion. The ability of soccer basic skill cannot be separated from good physical condition and one of the factors which can affect the soccer basic skill is agility [5-7]. The effort of improving player's ability in mastering soccer skill depends on the creativity of the coach. Most of coaches didn't pay attention to the method of training; they only rely on their personal experience without take a part in training activity as a coach. The result is they are not competent to do their profession competently [8]. The information available to child players is much less than that to adults. To date, there has been limited study investigating the physical and physiological characteristics of very young footballers [2] therefore, the aim of this study was to investigate correlation of anthropometric, physical muscular performance, situational variables and speed of football players 12- year.

Basic Hypothesis

Based on the purpose of this research and the methods by which the results will be processed, we present this hypothesis: Are there expected to be high correlations between anthropometric and motor variables?

Methods

Eighty-two 12-year-old footballers who were actively participating in the Albanian Children's Championship participated in the study. They had at least 4 years of training level, which consisted of two about 90 min sessions per week for about 9 months of the year. An informed consent was obtained from the players and their parents before the study began. Samples are included in these two spaces:

1. Anthropometry: height, weight, BMI.

2. Physical abilities: long jump from the ground, high jump, sprint 30 meters, abdominal muscles (sit up test).

Tests performed at the middle of the racing season in January (2020). Measurements of anthropometric dimensions and physical abilities were made at the time of regular exercise. At first, anthropometric measurements were made in the locker room, during which the players were wearing only underwear, and then on the football field, physical fitness measurements were made, during which the players were dressed in sportswear. Each test is first demonstrated by the tester. The ranking is done starting with the lightest tests and ending with the heaviest test. Height was measured using a stadiometer and body mass was measured using calibrated digital scales. BMI was calculated using the standard formula ($W(kg)/H(m^2)$). BMI is usually calculated as a measure of body fat percentage. A high BMI suggests relatively more body fat than a low BMI. Running speed of the players was assessed with a 30m. sprint attempt using dual-beam electronic time gates (New test 2000). The players were instructed to run as fast as possible along the 30 meters distance from a walking start. Speed was measured in 0.01 seconds, equal to the fastest value obtained from two tests used as a result of speed. The muscular strength of the lower body was assessed by means of the long jump test using plastic devices at length. Players were asked to stand with their feet on the ground in line. After gaining momentum, each subject was instructed to exit to the farthest point possible. The horizontal jump distance was measured in cm. equal to the value obtained from the two tests used as a result of the long jump.

Lower body muscle strength was assessed by means of a vertical jump test using a vertical jump device (New test 2000). Players were asked to stand with their feet flat on the ground, fully extend their arm and hand, and mark the height of the reach on foot. After taking a bending position, each subject was instructed to climb up to the highest possible point. The vertical jump height was measured in cm, equal to the highest value obtained from two tests used as the vertical jump result. The maximum vertical jump strength was calculated using the Sayers equation.

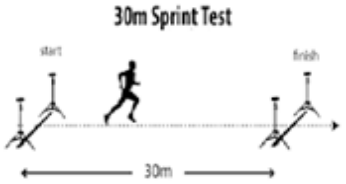
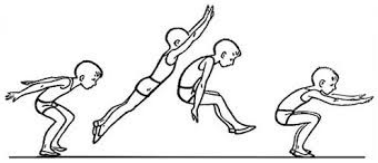
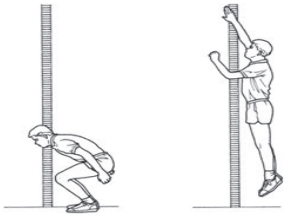
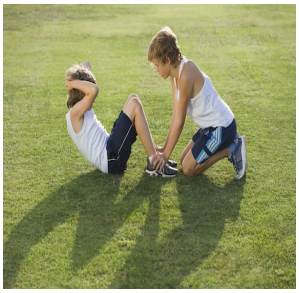
Power (W)=(60.7xvertical jump displacement(cm)+(45.3xweight(kg)-2055

Sit up test was conducted on the mattress, where the ups and downs of the trunk with his hands in his neck were counted in the amount of times for 20 seconds. Standard tools and deviations of height, body mass, BMI, vertical jump, long jump, sit up test and speed (30m) are given as descriptive statistics in children in football. Data were subjected to statistical analysis using the ANOVA method (Tables 1 & 2).

Table 1: Shows anthropometric and physical tools used to implement this study

Scale (Transportable) Which Enables Measurement with An Accuracy of 0.5kg	Stadiometer for Measuring Body Height with Accuracy 0.05cm	Measuring Layer of Plastic Material with a Length of 150cm. (in Which cm, and ml. are Marked)	Chronometer with Accuracy - 0.1sec	Mattress for Abdominal Muscles
				

Table 2: Shows methodology of physical tests performed in the study.

Event	Instructions	Picture
Running 30m Sprint	1. Run 30m as fast as you can! 2. Start the stopwatch when you begin running 30m Sprint. 3. Stop it when you pass the finish line! 4. Record the time taken.	
Standing Long Jump	1. Draw or mark a straight line. 2. Stand behind line, feet slightly apart. 3. Take off from two feet and land with two fees. 4. Measure distance from back of heel closest to line you took off from.	
Standing High Jump	1. Chalk your fingertips. 2. Stand sideways with your shoulder next to a wall, keeping your feet FLAT on the ground reach up as high as you can and make a mark. 3. Chalk your fingers again and jump and make a mark as high up the wall as you can. 4. Measure the difference between the two marks.	
Sit up test	1. Lie flat on a carpeted or cushioned floor with your knees bent at approximately right angles, with feet flat on the ground. Your hands should be resting on your thighs. The feet are not anchored. 2. Squeeze your stomach, push your back flat and raise high enough for your hands to slide along your thighs to touch the tops of your knees. Then return to the starting position. 3. Every time you return to the flat position, that counts as one sit up.	

Results

The anthropometric characteristics of the young soccer players are shown in (Table 3). Anthropometric measures of soccer players were as height 146.12±6.21cm, body mass 48.23±4.67kg and BMI 16.52±2.34(kg/m^2) [9]. The long jump, vertical jump, power, speed (30m) and sit up test performances of soccer players are shown in (Table 4). Long jump, vertical jump, power, speed (30m) and sit up measures of soccer players were as 156.17±19.21cm, 29.22±3.38 cm, 1879.7±338.95 watt, speed 5.08±0.43 sec. and 11.3±3.47 [10].

Table 3: Height, Body Mass and BMI measures of soccer players (N=82).

Parameters	Mean	±SD
Height (cm)	146.12	6.21
Body Mass (kg)	48.23	4.67
BMI (kg/m^{-2})	16.52	2.34

Table 4: Vertical Jump, Power and Speed (30m.) measures of soccer players (N=82).

Parameters	Mean	±SD
Long jump(cm.)	156.17	19.21
Vertical Jump (cm.)	29.22	3.38
Peak Power (W.)	1879.7	338.95
Speed (30m) (sec.)	5.08	0.43
Sit up (20 sec.)(x)	11.3	3.47

Discussion

Training methods in which subjects are trained for long and high jumps as well as short sprints are important. Vertical and horizontal jumps are usually considered a valuable measure of foot strength in footballers [11]. The most important issue for the coach and the football player is to determine the improvement of physical fitness through a well-planned training program without stopping the development of the player's game without neglecting the development of physical and technical skills. To plan effective training sessions, performance components need to be trained in relation to specific activities. It is possible that an increase in physical level will be more beneficial for an improvement in player ability also in game performance This is a special and important concern for very young footballers, who must first improve their skills their basic motor [8]. Philippaerts RM, et al. 2006 certify that the vertical jump and speed (30m) Performances of young football players aged 11.3±1.4 years were 27±5cm and 5.2±0.1sec [12]. The results of our samples in vertical jump and speed (30m) Are consistent with the previous studies to which we have referred. The results of the physical and physiological characteristics of 12-year-old football players give us orientation on the physical and physiological qualities that are important to become a member of the team and to play successfully in the future, also identifies the factors that limit performance. Physical and physiological skills contribute to the selection of talented footballers. [1,2]. It is worth noting that some of the variables have given high correlation but most of the variables have not given any correlation between the variables presented in Table 5, the long jump is related to the high jump as well as the 30m speed run at the level p=0.05, while with other variables it did not give a correlation.

Table: 5 Variables correlation coefficients in physical abilities.

		Long Jump	Vertical Jump	Peak Power	Speed	Sit Up
Long jump	Pearson Correlation Sig. (2-tailed)	1				
Vertical jump	Pearson Correlation Sig. (2-tailed)	.633*	1			
		0.049				
Peak power	Pearson Correlation Sig. (2-tailed)	-0.291	-0.365	1		
		0.415	0.3			
Speed	Pearson Correlation Sig. (2-tailed)	-0.576	-0.538	.661*	1	
		0.081	0.109	0.037		
Sit up	Pearson Correlation Sig. (2-tailed)	-0.227	-0.452	-0.343	-0.287	1
		0.528	0.19	0.332	0.421	

*: Correlation is significant at the 0.05 level.

Physiological standards play a crucial role in the selection of football talent. Success in physiological standards is an important prerequisite for success in football. Anthropometric and physiological profiling is best seen as an objective to monitor young players, physiological data may not be the unique prediction of competitive success in football. Also, training programs should pay attention to technical skills and teamwork engagement. To investigate all physiological characteristics of children players

and their development of training programs, further studies [13]. Physiological tests provide useful information on the physical abilities of the players and on their training status. Such assessments give us an orientation for the use of performance tests, as well as to gain knowledge of the individual requirements of the footballer [14]. In this research, referring to the results given, it is worth wishing especially in physical fitness tests, as the result has been average and unsatisfactory, perhaps in this case other psychological factors that affect performance and the stage of maturity have also influenced puberty is considered by many experts to be a very early stage, as many aspects are not defined, such as in anthropometry, basic motor, etc. Based on the facts of movement activities realized through training processes that represent a very complex and multidimensional process, as well as based on the results of this research, there is a need to pay more attention in the future to the advancement of trainers and professional support staff. Creating appropriate infrastructural conditions for the training process. Application of curricula designed by experts with work experience and proven results in professional work, starting from the newest categories to seniors. The application of the most advanced methods, as well as the variety of forms of organizing the training class within the training process in football [15]. Continuous monitoring of the development of motor skills (through various measurements), which represent a good basis for assessing the overall skills of footballers.

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