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RELATIONS OF MORPHOLOGICAL CHARACTERISTICS AND MOTOR ABILITIES IN U-15 SOCCER PLAYERS

Agron Thaqi[1], Jetmir Metaj[2], Bylbyl Sokoli[3], Isa Asllani[4]

[1] Faculty of Physical Education, University of Tetova – PhD student, RNM*
[2]Faculty of Physical Education, University of Tetova – Master student, RNM
[3]University of Prishtina, Faculty of Physical Education and Sport - Kosovo
[4]Faculty of Physical Education, University of Tetova, RNM
[*]Corresponding author e-mail: athaqi@hotmail.com

Abstract
Twenty elite U-15 soccer players were subjected to testing using the group of 5 morphological and 8 motor tests, with the aim of determining relation between morphological characteristics and motor abilities. To prove morphological characteristics 5 variables are applied: 1 tests for body mass, 1 longitudinal skeleton dimensionality test, and 3 circumference tests. To prove motor abilities, 8 variables are applied: Long jump, 5x10m agility, 10m running, 25m running, 50m running, High jump, Sideway steps, Sit-Up. The descriptive analysis of the basic statistical parameters shows that the variables applied in this research are most epicurtic, where the results are the lowest, and some of these variables have a pronounced asymmetry. The correlation analysis show that the coefficients of morphological variables are curved and appear as a homogeneous group with a high interrelationship at the confidence level of (p =0.01). The second group consists of the motor speed tests, while the third group is the motor tests of the explosive strength.

Keywords: morphological characteristics, motor abilities, soccer players, relation.

Introduction

The efficiency of the game is influenced by different factors, such as morphological characteristics, motor abilities, functional abilities, technical-tactic knowledge, psychological (conative and cognitive), but also a factor of sports luck. The most important factors are the situational-motor abilities, represented by a combination of motor and functional abilities with technical-tactic knowledge. They are the prerequisite for solving the game situations. A soccer player today has to have extraordinary motor abilities, especially speed, explosive power and speed endurance. Modern soccer requires specific soccer intelligence from the soccer player, meaning that they have to think fast, cope with different situations and have the ability of fast decision making (Erceg, Milić & Živković, 2013b; Rađa, Erceg & Grgantov, 2013).

Morphological characteristics are very important in realization of motor structures in which they are the real biomechanical basis, either as the facilitating factors, or the ones that make the performance harder. Besides this, morphological characteristics are very important for the realization of all the motor tasks in which one's own body, or part of the body, is moved, or the determined body position is maintained, whether the task is strength, speed, flexibility, coordination or balance. However, the need of knowing the laws of relation between morphological characteristics and motor abilities is extremely important because motor abilities can be manifested only through something that characterizes the morphological entity's

(examinee) structure. Therefore, the efficiency of motor manifestation directly depends on anthropometric dimensions, as the previous research showed (Reilly, Bangsbo, & Franks, 2000; Erceg, Zagorac, &Katić, 2008).

Success in soccer is dependet on a variety of factors including the physical characteristics and physiological capacities of the players, their level of skill, heir degree of motivation and tactics employed by them against the opposition. Some of these factors are not easily measured objectively, but others can be tested using standardized methods and can provide useful information for coaches. Most of the previous research aimed toward profiling and talent identification has been focused on the physical performance and skills of young soccer players (Bunc and Psotta (2001), Gil et al (2007), reilly, Bangsbo and Franks (2000). The studies of anthropometric dimensions, physical performance and soccer-specific skills of young players have provided partly consistent findings.

The research of anthropometric measures and motor abilities of young soccer players was a subject of research of other authors (e.g. Tumilty et al.)1993), Chin et al. (1994), Bunch et al. (2001), Casajus (2001), Erceg, Lastre and Lisica (2005), Andabak (2010).

The aim of this research was to determine relation between certain anthropometric characteristic and motor abilities of U-15 soccer players.

Methods

The sample of examinees was represented by U-15 soccer players of FC "Besa" from Peja (Kosovo). The group consisted of 20 boys, practicing soccer regularly in average 6 years, with 3 practices and one competitive match per week.

The sample of anthropometric variables consisted of group of 5 morphological measures: Body height, Body mass, Thorax circumference**,** Thigh circumference and Lower leg circumference**.**

The sample of motor variables consisted of group of 8 motor tests: 10m, 25m and 50m fast running, 5x10m agility, Long jump, High jump, Sideway steps, Sit-Up (SUP).

For all groups of variables system, basic statistical parameters and distribution parameters for each variable, and also measurements of asymmetry and normal distribution, have been calculated

Descriptive analysis and correlation analysis have been applied, in order to determine the relation between morphological and motor variables.

Results and Discussion

Table 1. Descriptive statistic parameters of applied variables

	N	Min.	Max.	Mean	S.D	Skewness	Kurtosis
Body height	20	44.0	80.0	55.85	9.86	1.0	.848
Body mass	20	157.0	181.0	168.35	8.15	.204	-1.65
Thorax circumfe..	20	68.0	97.0	80.65	6.87	.862	1.71
Thigh circumfe…	20	44.0	61.0	48.65	4.60	1.85	3.10
Lower leg circu..	20	30.0	40.0	33.35	2.58	1.40	1.79
Long jump	20	155.0	206.0	188.75	12.54	-.796	1.20

5x10m agility	20	38.0	49.0	43.32	2.50	-.064	.554
10m running	20	1.74	2.0	1.87	.068	.064	-.513
25m running	20	3.07	4.2	3.60	.238	.786	2.71
50m running	20	7.21	9.46	8.32	.626	-.026	-.253
High jump	20	11.94	13.21	12.75	.306	-.777	1.40
Sideway steps	20	.53	1.10	.837	.237	-.205	-2.09
Sit-Up	20	7.98	9.52	8.86	.389	-.426	.057

Legend: N – number or participants, Min – Minimum result, Max – Maximum result, SD – Standard Deviation, Skewness – measures of distribution shape, Kurtosis – measure of distribution curve.

Table 1 shows the results of descriptive statistical procedures on variables of morphological characteristics and motoric abilities. From motoric tests we can see that all variables have a homogeneous distribution in all tests, whereas tests Long Jump, 5x10m running, 50m running, Sideway steps, Sit-Up has negative asymmetry, that means young soccer players have different results and differences between each other in some caracteristics.

Table 2. Correlation matrix

	Body height	Body mass	Thorax circum.	Thorax circumfe.	Thorax circum.	Long jump	5x10 m agility	10m runnin g	25m runnin g	50m runnin g	High jump	Sidewa y steps	Sit-Up
Body height	1	.888**	.853**	.817**	.649**	.427	.151	.219	-.081	.050	.158	-.051	-.084
Body mass	**.888****	1	.630**	.517*	.337	.469*	.258	.094	-.205	-.110	.007	-.182	-.301
Thorax circumf..	**.853****	**.630****	1	.890**	.811**	.428	.179	.331	-.081	.019	.150	-.018	.030
Thigh circumf …	**.817****	**.517***	**.890****	1	.808**	.325	.098	.287	-.023	.052	.253	-.034	.114
Lower leg circu..	**.649****	.337	**.811****	**.808****	1	.187	-.030	.481*	-.043	.252	.195	.157	.167
Long jump	.427	**.469***	.428	.325	.187	1	.699**	-.205	-.567**	-.655**	-.537*	-.526*	-.491*

5x10m agility	.151	.258	.179	.098	-.030	**.699****	1	-.266	-.511*	-.738**	-.643**	-.578**	-.786**
10m running	.219	.094	.331	.287	**.481***	-.205	-.266	1	.040	.488*	.188	.484*	.323
25m running	-.081	-.205	-.081	-.023	-.043	**-.567****	**-.511***	.040	1	.470*	.336	.314	.406
50m running	.050	-.110	.019	.052	.252	**-.655****	**-.738****	**.488***	**.470***	1	.564**	.766**	.624**
High jump	.158	.007	.150	.253	.195	**-.537***	**-.643****	.188	.336	**.564****	1	.468*	.640**
Sideway steps	-.051	-.182	-.018	-.034	.157	**-.526***	**-.578****	**.484***	.314	**.766****	**.468***	1	.596**
Sit-Up	-.084	-.301	.030	.114	.167	**-.491***	**-.786****	.323	.406	**.624****	**.640****	**.596****	1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

The intercorrelation matrix of motor and morphological changes presented in table 2 show that between morphological changes exists an important statistical correlation at an important statistical level p=0.01.

Variable Body mass has correlation with variables Body height, Thorax circumference, Thigh circumference and Lower leg circumference with an important statistical level p=0.01, but there is not any correlation with any other motoric test.

Valuable Body height has correlation with variable Thorax circumference with an important statistical level p=0.01, Thigh circumference and the motoric test Long jump with an important statistical rate 0.05. Variable Thorax circumference has correlation with variable Thigh circumference and Lower leg circumference with an important statistical rate 0.01, whereas there is no correlation with any other motoric test. Variable Thigh circumference has correlation with variable Lower leg circumference with an important statistical rate 0.01, whereas with other morphological changes and motoric tests do not have any correlation with other variables. Variable Lower leg circumference has correlation with motoric test 10m running with an important statistical rate 0.05.

Variable Long Jump has correlation with variables 5x10m running, 25m running and 50m running with an important statistical rate 0.01, whereas variable High Jump, Sideway steps and Sit-Up has an important statistical rate 0.05, but there is not any correlation with any other morphological test.

Variable 5x10m running has a correlation with tests 25m running with an important statistical rate 0.05, whereas variables 50m running, High Jump, Sideway steps and Sit-Up has an important statistical rate 0.01.

Variable 10m running has a correlation with test 25m running and test Sideway steps with an important statistical rate 0.05.

Variable 25m running has a correlation with test 50m running with an important statistical rate 0.05.

Variable 50m running has a correlation with tests High Jump, Sideway steps and Sit-Up with an important statistical rate 0.01.

Variable High Jump has a correlation with Sideway steps and Sit-Up. Test Sideway steps has a correlation with test Sit-Up with an important statistical rate 0.01.

Conclusions

The basic aim of this research was to determine the relation between morphological characteristics and motor abilities in young soccer players.

The descriptive analysis of the basic statistical parameters shows that the variables applied in this research are most epicurtic, where the results are the lowest, and some of these variables have a pronounced asymmetry.

The correlation analysis show that the coefficients of morphological variables are curved and appear as a homogeneous group with a high interrelationship at the confidence level of (p =0.01). The second group consists of the motor speed tests, while the third group is the motor tests of the explosive strength.

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