SPEED AS AN IMPORTANT COMPONENT OF FOOTBALL GAME

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Abstract

Speed as an important component of football games has an important place in the training process. The setting of today's football requires faster and faster players, that would be unpredictable and elusive for the opponent. For this reason, this investigation was concerned with speed in football in an attempt to understand the laws of its development. The study was conducted among 60 participants of football schools, 13 and 14 ± 6 months years of age in order to determine the relations between motor speed and the situational-motor speed in football. Motor speed as a predictor system consisted of eight tests: 1. Sprint speed: running speed at 20 meters, running speed at 50 meters, running speed at 60 meters, running speed at 100 meters and running speed at 200 meters. 2. Segmentary speed: foot taping, feet tapping on the wall and rotation of the foot. Criterion system of situational-motor speed in football were tested by: dribbling speed with obstacles, dribbling speed at a distance of 20m, dribbling speed with a change in direction at a 90º and dribbling speed by a semicircle. By using canonical correlation and regression analysis the obtained results have met expectations while working on this study and have showed a high level of relation of two observed areas, both at the multivariate level, and between some individual tests.

Key words*: motor speed, situational-motor speed, football, speed training*

Introduction

Speed is highly genetically inherent motor ability of as quickly as possible passing from one place to another. Even with well-designed training that takes into account the individual abilities of players, it is very small chance of developing this capability in its original "pure" form. However, the development of speed can be done indirectly, by improving the technique of movement and by working on developing the necessary muscle groups. The elements that influence the development of speed we can include (according to Vrgoč, 2007): length, frequency and rhythm of steps, hand speed, plyometric jumps, dynamic flexibility, a sense of relaxation, mental focus, heart stability, posture, weight control, a series of downhill training, development of appropriate muscle groups (lower limbs, abdomen, chest, back, shoulder region). Straight rapid movement is not the only moving in football and developing just this form of movement would not be enough to prepare players for the match. In football we distinguish between several categories of speed. Komes (2003) is mentioning submodels of speed action, that in some specific order allow to the player to move fast and fulfill his tasks. Before some movement happens, it is necessary quickly to understand and anticipate the situation and make a decision. Speed of reaction then appears as the fourth submodel, also known as explosiveness, and it takes place in the first three to four steps. After that we have the speed of movement, actions and activities. Demonstrations of speed that are visible on the field and classify players from fastest to slowest, can be divided into three categories. The first category refers to the speed of movement without the ball or so-called "pure speed", the second is the speed with the ball and the third is characterized as the speed of the first step.

The last is perhaps the most important and most widely-used category of speed at every football player. It allows him, while dribbling, in playing one to one, the possibility of easier passing his opponent and creating position for adding a team-mate, still moving with the ball or shot at goal. Speed of the first step is the closest connection with the technical and tactical tasks of players. Although it sometimes seems that pure speed can compensate for many of the elements of football game, it is not enough only to be fast, but also knowing how to deal with the ball, especially as football is one of the technically difficult sport, because less accurate, lower limbs are used.

Speed development

It is generally known that a speed training began in the early school age (Rađo et al., 2003; Kotzamanidis, et al., 2005; Gissis et al., 2006; Andrzejewski et al., 2009). Until the maturation period, all modalities of speed is constantly improving. During puberty, the adaptation of nerve-muscle reactions is happening, leading to finer and stronger movement and the demonstration of speed itself is not only the result of mastering sprint skills, but of a better muscular coordination (Rađo et al., 2003). For the development of the basic speed the following methods can be used (according to Drabik, 1996): 1) Interval method, characterized by repeated practice, and between each exercise, the rest is taking place, 2) The method of repetitive work, characterized by the duration of rest between exercises, which are determined by individual evaluation of players about readiness for the next exercise, 3) The method of changing work, is consisted of more basic ways /- various acceleration, in which during each exercise,

intensity of work is gradually increasing, and thus the speed of movement, and so maximum speed is reaching at the end of the section, - various progressions, where within each set, speed gradually increases from section to section providing maximum speed at the final section, - running with a flying start, in which after the arbitrary phase of acceleration, the determined length of the section is running, - running down the slope (slope increases running speed above the maximum), - rapid response to audio and visual sign (player performs the given movement immediately after the sign - with the shortest latent reaction time), - relay form of speed running (more players makes the team, relay is transmitted by the direction of the columns or in a circle) and - handicap-running (slower player receives a certain advantage at the start)/.

Some exercises for developing speed in football
Running from the sidelines, - 1 to 1 after the sudden pass, - obstacle races, - duels in moving with technical elements, - run to win the ball, - shot at goal from full race, - jumpings at a certain distance. In order to verify in practice, what is the impact of motor speed on success in football, testing and comparing of football schools students results was performed that they have achieved in tests of speed and situational-motor speed in football.

Methods

The study was conducted among 60 participants of football schools, 13 and 14 ± 6 months years of age in order to determine the relations between motor speed and the situational-motor speed in football. Motor speed as a predictor system consisted of eight tests of sprint and segmentary speed. 1. Sprint speed: running speed at 20 meters (TR20), running speed at 50 meters (TR50), running speed at 60 meters (TR60), running speed at 100 meters (TR100) and running speed at 200 meters (TR200). 2. Segmentary speed: foot taping (MTAN), feet tapping on the wall (MTAZ) and rotation of the foot (MKRN). Criterion system of situational-motor speed in football were tested by: dribbling speed with obstacles (BVSL), dribbling speed at a distance of 20m (BV20), dribbling speed with a change in direction at a 90º (BV90º) and dribbling speed by a semicircle (BVPOL).

Results

Table 1. Canonical correlation analysis of motor speed and situational-motor speed in football

Can.R	Can.R^2	Chi-sqr.	df	P
.63	.40	53.67	32	.010*

The results of testing the level of the canonical relationships between the predictor and the criterion system (table 1), are indicating that one significant canonical relationship at p <.05 is identified. Canonical relations are explained by the size of the canonical correlation coefficient (Can.R = .63), which turned into a significant function amounts to P = .010.

The coefficient of determination (Can.R2 = .40) explains the proportional connection between the two sets, so the relation of motor speed and the situational-motor speed in football is 40%.

Table 2. Canonical factors

	Root 1		Root 1
TR20	0.46	BVSL	0.74
TR50	-0.46	BV20	0.86
TR60	0.16	BV90º	0.58
TR100	-0.35	BVPOL	0.89
TR200	-0.22		
MTAN	-0.60		
MTAZ	-0.48		
MKRN	0.06		

The definition of the canonical factor (table 2), is most affected by foot taping (MTAN -0.60), feet tapping on the wall (MTAZ -0.48), running speed at 20 meters (TR20 0.46) and running speed at 50 meters (TR50 -0.46). A somewhat smaller effect was found in running speed at 100 meters (TR100 -0.35). In the remaining tests, significantly defining of the structure of the canonical factors does not exist. Criterion system indicates a very significant impact of situational-motor tests of speed in football. Dribbling speed by a semicircle (BVPOL 0.89) and dribbling speed at a distance of 20m (BV20 0.86) have the greatest importance, slightly lower rate is noted at dribbling speed with obstacles (BVSL 0.74) and the lowest impact is at dribbling speed with a change in direction at a 90º (BV90º 0.58). The results indicate a general factor that significantly defines those regions can be defined on the basis of the canonical relation of motor speed predictor system and situational-motor speed in football criterion system.

Table 3. Crosscorrelation matrix

Cross-cor.	BVSL	BV20	BV90º	BVPOL
TR20	-0.02	0.36	0.19	0.23
TR50	-0.30	-0.36	-0.28	-0.17
TR60	-0.08	0.14	0.12	0.10
TR100	-0.28	-0.06	0.02	-0.23
TR200	-0.33	-0.04	-0.01	-0.12
MTAN	-0.16	-0.33	-0.23	-0.38
MTAZ	-0.06	-0.29	-0.20	-0.29
MKRN	-0.10	0.04	-0.12	-0.01

Crosscorrelation matrix of two systems (table 3) shows the contribution of motor speed to the performance of situational- motor speed in football at the individual level. Matrix is characterized by coefficients of medium and low intensity. Significant correlation is observed at dribbling speed with obstacles (BVSL) with the running speed at 50, 100 and 200 meters (BVSL/TR50 -0.30; BVSL/TR100 -0.28; BVSL/TR200 -0.33). Dribbling speed at a distance of 20m (BV20) has a significant correlation with running speed at 20 and 50 meters (BV20/TR20 0.36; BV20/TR50 -0.36) and with tests of segmentary speed foot taping and feet tapping on the wall (BV20/MTAN -0.33; BV20/MTAZ -0.29). Dribbling speed with a change in direction at a 90º (BV90º) has a significant correlation only with the

running speed at 50 meters (BV90º/TR50 0.28). Dribbling speed by a semicircle (BVPOL) was significantly associated with foot taping and feet tapping on the wall (BVPOL/MTAN -0.38; BVPOL/MTAZ -0.29). Regression analysis (table 4) indicates that the predictor system of motor speed on the multivariate level is in statistically significant relation with three of four tests of situational-motor speed in football: dribbling speed with obstacles (BVSL .010 - common variance was 31%, it can be seen from the values of the coefficient of determination Ro^2 = .31), dribbling speed at a distance of 20m (BV20 .004 - common variance is 34%, Ro^2 = .34) and dribbling speed by a semicircle (BVPOL .004 - common variance is 34%, Ro^2 = .34). Univariate level indicates the following: Looking at the correlation coefficients (R) and partial correlation coefficients (Part R) dribbling speed with obstacles (BVSL) is most closely associated with running speed at 200 meters (TR200 R = -0.47; Part-R = -0.39) and foot taping (R = -0.36 MTAN; Part-R = -0.27), which is confirmed by the significance of partial coefficients (Q) for running speed at 200 meters (TR200 .004) and foot taping (MTAN .050).

Dribbling speed at a distance of 20m (BV20) has the connection with running speed at 20 meters (TR20 R = 0:46; Part-R = 0.47), at 50 meters (R = -0.43 TR50; Part-R = -0.43) and running speed at 200 meters (TR200 R = -0.31; Part-R = -0.28). Significances are for the running speed at 20 meters (TR20 .001), at 50 meters (TR50 .001) and running speed at 200 meters (TR200 .046). Dribbling speed with a change in direction at a 90º (BV90º) has only one significant association at p <.05 with running speed at 50 meters (TR50 .048) with the correlation and partial correlation (R = -0.28; Part-R = - 0.27).

Table 4. The regression analysis of predictor system with a single criterion variables

	BVSL				BV20			
	R	Part-R	t	Q	R	Part-R	t	Q
TR20	-0.03	-0.03	-0.19	0.85	0.46	0.47	3.47	.001*
TR50	-0.24	-0.26	-1.88	0.07	-0.43	-0.43	-3.44	.001*
TR60	0.03	0.03	0.23	0.82	0.21	0.21	1.56	0.13
TR100	-0.06	-0.05	-0.37	0.71	0.06	0.06	0.43	0.67
TR200	-0.47	-0.39	-3.04	.004*	-0.31	-0.28	-2.05	.046*
MTAN	-0.36	-0.27	-2.00	.050*	-0.34	-0.26	-1.94	0.06
MTAZ	-0.06	-0.04	-0.32	0.75	-0.09	-0.07	-0.47	0.64
MKRN	-0.08	-0.08	-0.58	0.56	0.16	0.18	1.31	0.20
	Ro	Ro^2	F-test	Q	Ro	Ro^2	F-test	Q
	0.56	0.31	2.89	.010*	0.59	0.34	3.32	.004*
	BV90º				BVPOL			
	R	Part-R	t	Q	R	Part-R	t	Q
TR20	0.15	0.14	1.02	0.31	0.11	0.11	0.81	0.42
TR50	-0.28	-0.27	-2.03	.048*	-0.15	-0.16	-1.19	0.24
TR60	0.07	0.07	0.50	0.62	0.19	0.19	1.38	0.18
TR100	0.17	0.14	1.00	0.32	-0.17	-0.16	-1.16	0.25
TR200	-0.18	-0.13	-1.68	0.10	-0.37	-0.32	-2.43	.019*
MTAN	-0.35	-0.25	-1.84	0.07	-0.36	-0.28	-2.07	.044*
MTAZ	0.05	0.03	0.24	0.81	-0.16	-0.12	-0.88	0.38
MKRN	-0.04	-0.04	-0.27	0.79	0.03	0.04	0.27	0.79
	Ro	Ro^2	F-test	Q	Ro	Ro^2	F-test	Q
	0.45	0.2	1.62	0.14	0.58	0.34	3.29	.004*

Dribbling speed by a semicircle (BVPOL) is most closely associated with running speed at 200 meters (TR200 R = -0.37; Part-R = -0.32) and foot taping (R = -0.26 MTAN; Part-R = -0.28), which is confirmed by the importance of partial coefficients (Q) for running speed at 200 meters (TR200 .019) and foot taping (MTAN .044).

Discussion

In 2009, there was a research performed under the auspices of the german magazine Der Spiegel in order to determine who is the fastest player in the world. Measurements were done during a game at a time until the player has the ball under the pressure from his opponents. The results showed that the fastest player was portuguese striker Cristiano Ronaldo, Real Madrid player with a speed of 33.6 km/h. Followed by dutchman Arjen Robben with a 32.9 km/h, then Theo Walcott (32.7 km/h) and Wayne Rooney (32.6 km/h) from England, while the fifth was another dutchman Robin Van Persie with achieved speed of 32.1 km/h . Coach of Manchester United, Alex Ferguson gave very interesting statement about his now former player Cristiano Ronaldo describing him as a football player that is just as fast with the ball as without it, if not faster.

If we consider that these players are one of the finest and best paid players of the world (Cristiano Ronaldo is officially best paid football player in the world), then we will examine how the components of physical abilities, such as motor speed, make their game better, which is reflected on the price of one player on the market. The concept of football (according to Bisanz & Vieth, 2000) is reflecting in the fact that everything that today is a top form and success in football, tomorrow can be easily overcome, so it should not follow the same concept of play and training too long. The main objective in developing the game puts the success to the forefront without neglecting the play. One of the trends suggests that the speed of play will continue to increase, also the pace of play in the narrowest space around the ball, that is controlled skillfully. In this way, the player with the ball will have less time to orient, before looking at a situation, deciding and executing. The game will be more and more speed-oriented with fast actions during the whole game in all positions and in all situations, such as dribbling with the final shot on goal, sliding of defender in the full course, sudden change of speed or free running. In almost all the actions, their performance based on speed is the base of success or failure. The teams that adhere to this trend can continue to count on good results.

Many studies was dealing with the speed in football, often through a variety of programs for its development (Impellizzeri et al., 2008; Jullien et al., 2008) or in relations with other anthropological areas and physical indicators (Mujika et al., 2000; Newman, Tarpenning & Marino, 2004; Aziz et al., 2007).

As already mentioned, the speed itself is difficult to develop, but with the help of some other dimensions, it can be influenced in order to achieve better results. Alternative is usually required in strength developing, which can compensate in certain percentage for the lack of the required speed in task executing. However, speed is also associated with the agility that incorporates the components of velocity and it is considered as changing movement direction but with maintaining the achieved speed (Smythe, 1995). All this points to the need for comprehensive planning, programming and implementation of training process, to a final product, a football player who has a highly developed motor ability such as speed.

Conclusion

The results of this study showed a high correlation of motor speed and situational-motor speed in football. Both analysis used on this occasion, indicated a high statistical significance at the level of $p < .01$, and expressed by the confidence interval 99%. On an individual level, tests of motor speed which usually had statistical correlation with criterion variables were the sprinting and sementary speed tests: running speed at 200 meters (TR200) and foot taping (MTAN). It can be concluded that the speed as a basic motor ability is very important in the execution of technical elements in the football game.

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BRZINA KAO VAŽNA KOMPONENTA NOGOMETNE IGRE

Sažetak

Brzina kao važna komponenta nogometne igre ima važno mjesto u trenažnom procesu. Postavke današnjeg nogometa zahtijevaju sve brže i brže igrače koji mogu bit inepredvidljivi i neuhvatljivi za protivnika. Iz ovih razloga, ovo istraživanje se bavilo brzinom u nogometu u pokušaju razumijevanja zakonitosti razvoja brzine. Istraživanje je provedeno sa 60 sudionika nogometne škola, uzrasta 13 i 14 godina (± 6 mjeseci) u skladu s ciljem utvrđivanja relacija između motoričke brzine i situacijsko-motoričke brzine u nogometu. Prediktorski sustav općeh motorike sadržavao je osam testova sprinta i segmentarne brzine: 1. Brzina trčanja: trčanje na 20, 50, 60, 100 i 200 metara; i 2. Segmentarna brzina: taping nogom, taping nogom o zid s rotacijom stopala. Kriterijski sustav situacijsko-motoričke brzine u nogometu bio je testiran: brzina driblinga s preprekama, brzina driblinga na 20 m, brzina driblinga s promjenom pravca pod 90º i brzina driblinga u polukrugu. Kanoničkom korelacijskom i regresijskom analizom dobiveni rezultati su potvrdili očekivanja ovog istraživanja i pokazali visok stupanj relacija dva promatrana prostora, u oba slučaja, na multivarijantnoj razini, kao i između pojedinačnih testova.

***Ključne riječi**: brzina, situacijsko-motorička brzina, nogomet, trening brzine*

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