

SPEED DYNAMICS OF ELITE JUNIOR PLAYERS IN THE FOOTBALL GAME – A CASE STUDY

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Abstract: Speed is an essential factor in the training of football players. Speed training is based on a series of premises that, in some aspects, distinguish it from other motor skills. The purpose of the present research was to determine to what extent there are significant speed differences between players, depending on the position occupied and the needs required according to the model established for the team.

In our research we started from the following hypotheses. We decided to answer some questions that can be useful to all specialists in the field: 1. What differences exist between players who play in the same position in terms of speed (U18, U17 and U16)? 2. What is the speed difference between the junior teams for the purpose of establishing the core/official team?

Materials and method. The research was carried in a football club, age groups Under 18, 17 and 16. All teams players were tested, but only the best results obtained by 24 players according to the 8 basic positions were taken into account for the 1-4-3-3 game system. In this way, conclusions can be drawn about the use of players as full main players according to the speed motor quality.

Discussion and Conclusion. The high volume of effort given by the specificity of the football game leads to the conclusion of the rational and economic involvement of the player, of conserving energy during the game, so that in the phases of maximum demand of each zone and position, the athlete can cope with maximum efficiency in the idea of executing individual and collective tasks as quickly as possible. The execution of technical-tactical actions with a high efficiency by a football team is conditioned by their rapid development, so at the maximum possible speed.

Keywords: *football, speed, players, elite.*

Introduction

Modern football is based on a number of aspects, among them the selection of valuable players with very good physical qualities, but also who can put into practice a modern tactic adapted to the specific needs of the game that is played with great intensity.

Speed is the motor quality that almost always defines the requirements of specialists in all its forms of manifestation: reaction, execution, repetition or movement. Any technique or tactical action a player performs during training or a game becomes more difficult for opponents to counter if executed at speed. In the training process of young players, speed is an important factor that determines sports success (Kalinowski et. al. 2021). In their work, coaches depend on results, most of the time they are based on coherent and above all scientific work (Cosma et. al., 2021).

The speed of a players movement during a match depends not only on running efficiency and other motor abilities (motor pillar), but also on psychomotor skills such as speed and

accuracy of perception, prediction, decision making, choice and speed of response (cognitive pillar) Duk et al. (2011). In order to be effective, the elements and technical procedures within the football game, executed at maximum speed and with precision, give the possibility of appreciating the highest degree of mastery (Stoica & Barbu, 2014) and they must be mastered correctly, by repeating them in easy conditions, then in near game conditions and in the game.

Technical procedures and tactical actions will be executed as quickly as possible, accustoming early children to the speed of execution of game phases, an important feature of the game. It follows from this that there is a close dependence between basic technical training and speed development. So, however talented a child may be, if he is not genetically endowed with elements that define and condition the speed of the game, he will not be able to impose himself in front of the opponent. In this case the examples can be multiple: quick kicking of the ball, goalkeeper's reflex, quick intervention for

dispossession, quick control of the ball, quick one-twos and clearances, counter-attacks and quick attacks, effective offensive and defensive transitions. The speed of response to various stimuli is conditioned by the speed with which certain situations are noticed or anticipated. Offensive and defensive tactical actions will have increased efficiency, as a result of their deployment at speed, without the possibility of a quick reaction from the opponent (Barbu & Stoica, 2020).

Speed training is based on a series of premises that, in some aspects, distinguish it from other motor skills. The first, and the most important, is the intensity which must always be maximum. In turn, these principles must comply with two conditions, that there be a control of the gesture to be performed and that the execution can be carried out in varied conditions, in other words not to be standardized.

The purpose of the present research is to determine to what extent there are significant speed differences between players, depending on the position occupied and the needs required according to the model established for the team.

In our research we started from the following hypotheses. We decided to answer some questions that can be useful to all specialists in the field:

1. What differences are there between players who play in the same position in terms of speed (U18, U17 and U16)?
2. What is the speed difference between the junior teams for the purpose of establishing the core/official team?

Materials and method

The research was carried out at a football club from Romania, age groups Under 18, 17 and 16, in table 1 there are presented the anthropometric characteristics of the subjects. All players of the teams were tested, but only the best results obtained by 24 players according to the 8 positions were taken into account basic of the 1-4-3-3 game system. In this way, conclusions can be drawn about the use of players as starters according to the speed motor quality. Since statistical research shows that the average top speed running of a soccer player is over the distance of 18-20 m, we analyzed the statistical differences over this distance.

Table 1. Statistical data – height and weight

NO.	POSITION	HEIGHT			WEIGHT		
		U16-2007	U17-2006	U18-2005	U16-2007	U17-2006	U18-2005
1.	Goalkeepers	1,87	1,89	1,97	73,4	77,2	78
2.	Right backs	1,67	1,79	1,73	66	69	70,5
3.	Left backs	1,69	1,80	1,71	64,5	71	65
4.	Centre backs right/left	1,84	1,82	1,87	78,5	72	77
5.	Defensive midfielder	1,73	1,86	1,81	68	80,5	75
6.	Central midfielder	1,75	1,71	1,74	66	65	64
7.	Right/Left winger	1,80	1,83	1,89	71	77	76
8.	Striker	1,88	1,76	1,85	77	70	76,5
	X	1,78	1,81	1,82	70,55	72,71	72,75
	Median	1,78	1,81	1,83	69,50	71,50	75,50
	STDV	0,08	0,06	0,09	5,31	5,12	5,57

Results

In the following tables (Table 2, 3, 4) there are presented the tests results obtained on speed on 10, 20 and respectively 30 m.

To better illustrate the statistical differences over the proposed distance tested there are presented also the graphic illustration of the result. The figures 1, 3, 5 present the results on the three distances

according to players position on the analysed teams. Then the figures 2, 4, 6 present the results of each subject grouped by team.

Here are the results obtained by elite junior players in the 10, 20 and 30 meter sprint tests.

Table 2. Statistical description of the U18, U17 and U16 junior teams - Speed on 10 m

NO.	POSITION	SPEED 10 M			PARAMETRES		
		U16-2007	U17-2006	U18-2005	Mean (m)	Median	Standard deviation
1.	Goalkeepers	1,979	1,932	1,978	1,96	1,98	0,03
2.	Right backs	1,859	1,853	1,805	1,84	1,85	0,03
3.	Left backs	1,832	1,863	1,826	1,84	1,83	0,02
4.	Centre backs right/left	1,866	1,860	1,863	1,86	1,86	0,00
5.	Defensive midfielder	1,954	1,865	1,931	1,92	1,93	0,05
6.	Central midfielder	1,838	1,884	1,867	1,86	1,87	0,02
7.	Right/Left winger	1,880	1,874	1,847	1,87	1,87	0,02
8.	Strikers	1,930	1,831	1,921	1,89	1,92	0,05
	X	1,89	1,87	1,88			
	Median	1,87	1,86	1,87			
	STDV	0,06	0,03	0,06			

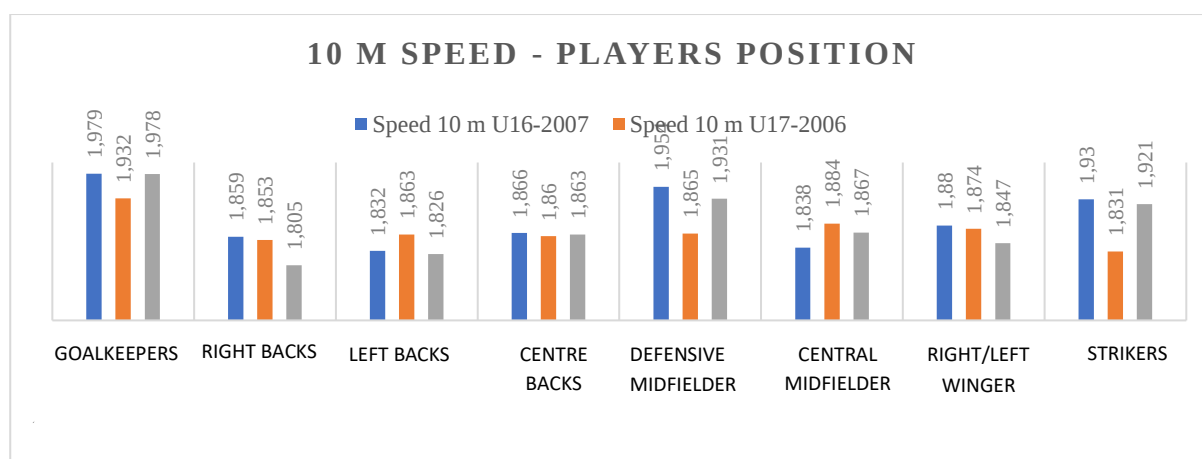


Figure 1. Comparison of players by position on 10m running

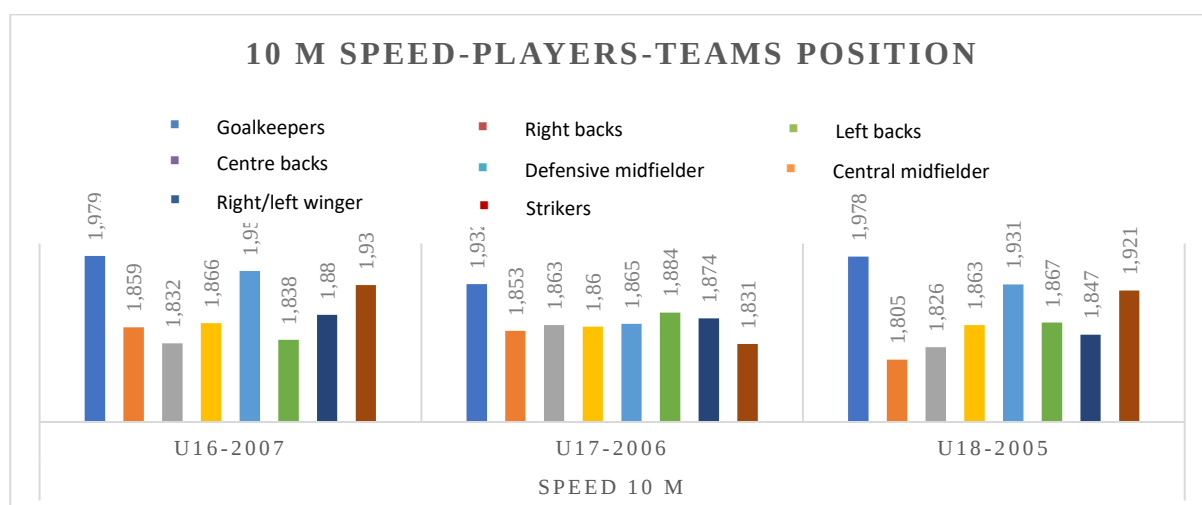


Figure 2. Comparison of players by position and team on 10m running

Table 3. Statistical description of junior teams U18, U17 și U16 - on 20 m running

NO.	POSITION	SPEED 20 M			PARAMETRES		
		U16-2007	U17-2006	U18-2005	Mean (m)	Median	Standard deviation
1.	Goalkeepers	3,354	3,234	3,396	3,33	3,35	0,08
2.	Right backs	3,181	3,131	3,121	3,14	3,13	0,03
3.	Left backs	3,089	3,108	3,092	3,10	3,09	0,01
4.	Centre backs right/left	3,166	3,165	3,105	3,15	3,17	0,03
5.	Defensive midfielder	3,179	3,181	3,237	3,20	3,18	0,03
6.	Central midfielder	3,179	3,192	3,149	3,17	3,18	0,02
7.	Right/Left winger	3,114	3,148	3,159	3,14	3,15	0,02
8.	Strikers	3,281	3,107	3,158	3,18	3,16	0,09
	X	3,19	3,16	3,18			
	Median	3,18	3,16	3,15			
	STDV	0,09	0,04	0,10			

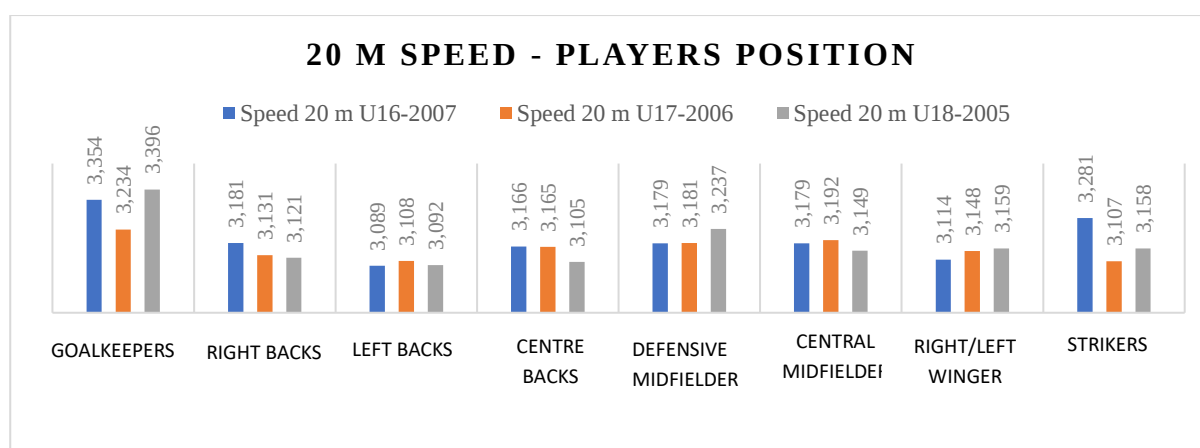


Figure 3. Comparison of players by position on 20 m running

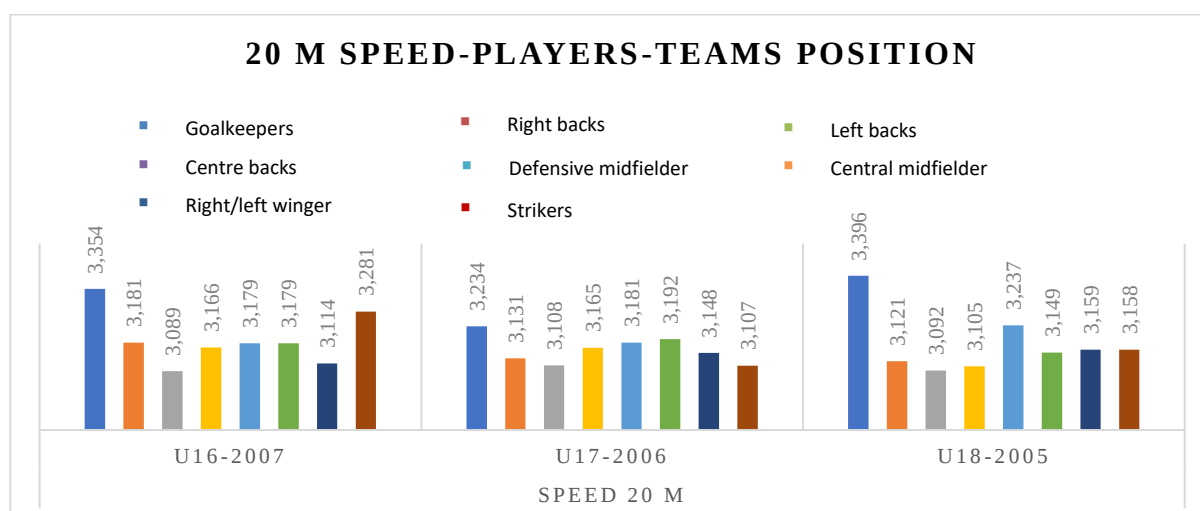


Figure 4. Comparison of players by position and team on 20 m running

Table 4. Statistical description of junior teams U18,U17 and U16 - on 30 m running

NO.	POSITION	SPEED 30 M			PLAYERS PARAMETRES - POSITIONS		
		U16-2007	U17-2006	U18-2005	Mean (m)	Median	Standard deviation
1.	Goalkeepers	4,709	4,413	4,721	4,61	4,71	0,17
2.	Right backs	4,414	4,291	4,346	4,35	4,35	0,06
3.	Left backs	4,241	4,255	4,267	4,25	4,26	0,01
4.	Centre backs right/left	4,375	4,349	4,233	4,32	4,35	0,08
5.	Defensive midfielder	4,443	4,434	4,394	4,42	4,43	0,03
6.	Centre midfielder	4,402	4,439	4,373	4,40	4,40	0,03
7.	Right/left winger	4,347	4,386	4,397	4,38	4,39	0,03
8.	Strikers	4,493	4,269	4,353	4,37	4,35	0,11
	X	4,43	4,35	4,39			
	Median	4,41	4,37	4,36			
	STDV	0,14	0,07	0,15			

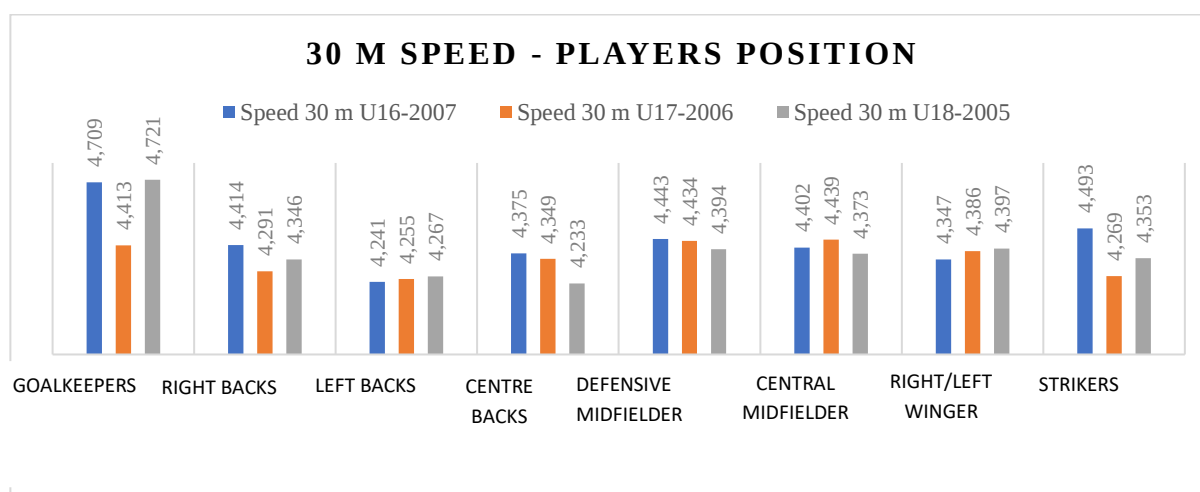


Figure 5. Comparison of players by position on 30 m running

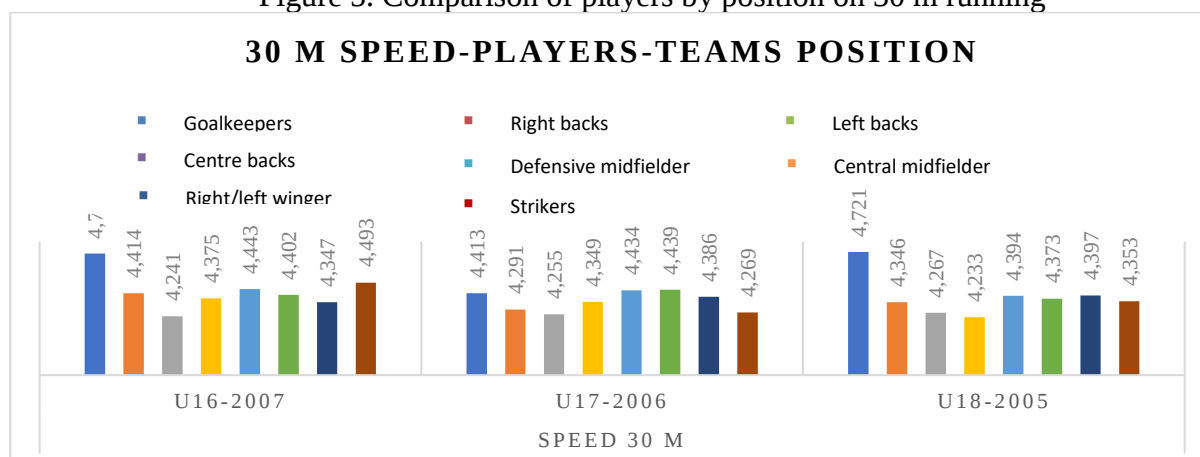


Figure 6 Comparison of players by position and team on 30 m running

Table 5. The results obtained by the players at the speed of 20 m - goalkeepers

Position	Speed 20 m		
	U16-2007	U17-2006	U18-2005
Goalkeepers	3,354	3,234	3,396



Figure 7. Comparison of soccer players at 20m speed – goalkeepers

Table 6. The results obtained by the players at the speed of 20 m - right backs

Position	Speed 20 m		
	U16-2007	U17-2006	U18-2005
Right backs	3,181	3,131	3,121

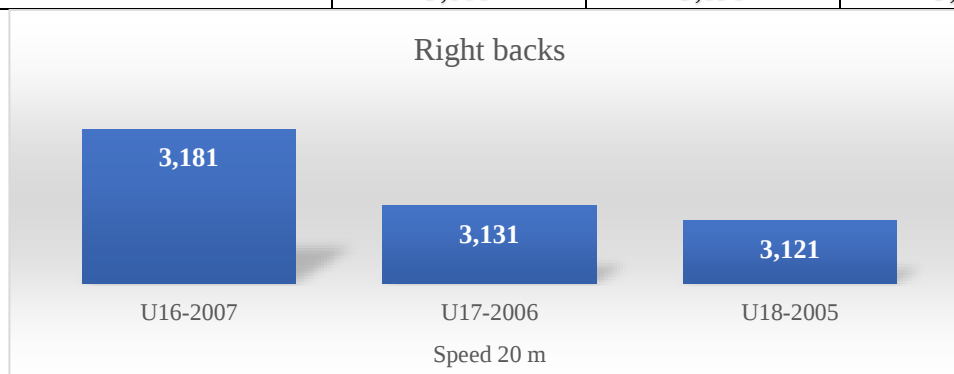


Figure 8. Comparison of soccer players at 20m speed - right backs

Table 7. The results obtained by the players at the speed of 20 m - left backs

Position	Speed 20 m		
	U16-2007	U17-2006	U18-2005
Left backs	3,089	3,108	3,092

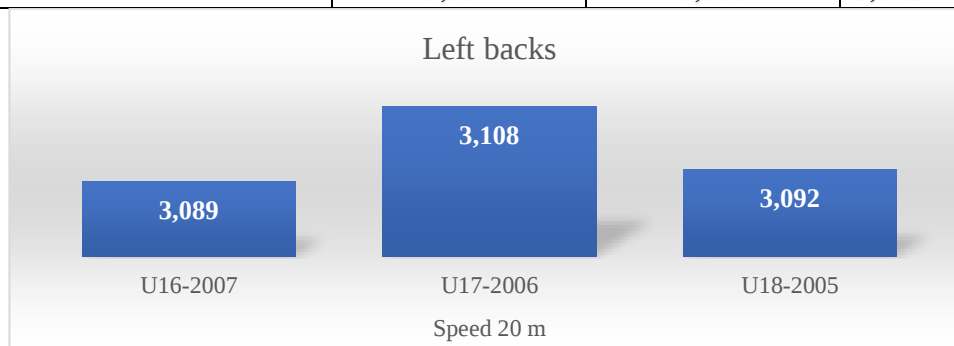


Figure 9. Comparison of soccer players at 20m speed - left backs

Table 8. The results obtained by the players at 20m speed – right/left center backs

Position	Speed 20 m		
	U16-2007	U17-2006	U18-2005
Centre backs right/left	3,166	3,165	3,105

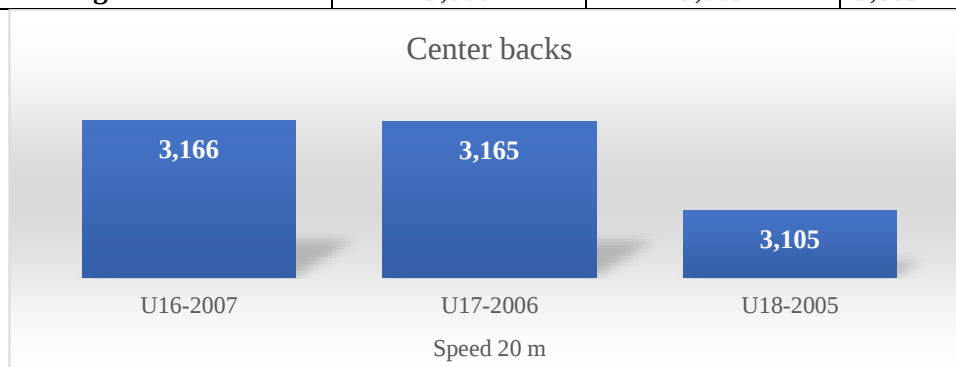


Figure 10. Comparison of soccer players at 20m speed - center backs

Table 9. The results obtained by the players in 20m speed – Defensive midfielders

Position	Speed 20 m		
	U16-2007	U17-2006	U18-2005
Defensive midfielders	3,179	3,181	3,237



Figure 11. Comparison of 20m Speed Soccer Players - Defensive Midfielders

Table 10. The results obtained by the players at the speed of 20 m – Central midfielders

Position	Speed 20 m		
	U16-2007	U17-2006	U18-2005
Central midfielders	3,179	3,192	3,149



Figure 12. Comparison of soccer players at speed 20 m – central midfielders

Table 11. The results obtained by the players at speed on 20 m - right/left wingers

Position	Speed 20 m		
	U16-2007	U17-2006	U18-2005
right/left winger	3,114	3,148	3,159

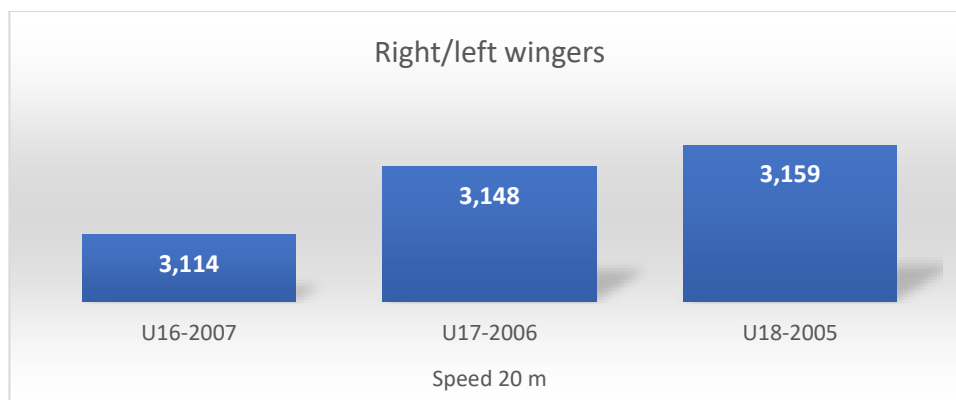


Figure 13. Comparison of soccer players at 20m speed - wingers

Table 12. The results obtained by the players at speed on 20 m –strikers

Position	Speed 20 m		
	U16-2007	U17-2006	U18-2005
Strikers	3,281	3,107	3,158



Figure 14. Comparison of soccer players at 20m speed - Strikers

Discussion and Conclusion

The specific physical training is carried out with strictly specialized means that develop the combinations of qualities primarily determined by the particularities of the sports branches, by the muscle groups involved in the effort, by the type of request (Cosma et al., 2017). Strong performance during the training of young football players is one of the major criteria of effectiveness and correctness of the training process. It is therefore vital to examine the problem of speed-strength training organization and selection of the most effective means and their balance (Bolotin & Bakayev, 2017). Both athletic exercises and those aimed at technical-tactical training can be used in

training to develop the speed specific to the football game. Their use in a technical-tactical regime must meet certain conditions. First of all, it is necessary that the exercise is very well mastered in order to be able to perform it at maximum speed. Secondly, it would be ideal to focus on exercises specific to the chosen game model (Barbu, 2021), different game structures, games that include quick counterattacks as the first tactical solution after recovering the ball that influences the number of positive results in attack (Turner & Sayers, 2010) and quick attacks, quick combinations etc.

Thirdly, a specific framing of the effort dynamics is required, in accordance with the specific mode of speed development: high

intensity efforts (10%) are combined with longer periods of low intensity (Alonso-Callejo et al., 2022) and the duration of the exercises designed so that the speed does not decrease towards the end of them, the number of repetitions and the breaks that must ensure recovery.

In training, the development of game speed requires submaximal intensities, up to 85% of the maximum capacity, so that there is a control of movements within the technical-tactical action, knowing that speed can be better influenced at young ages, through scientific training.

It is advisable to carry out periodic testing of speed both athletically and in the form of quick tests executed with the ball (Barbu, 2012). The body of the players in this case will be rested, knowing that the application of control samples for speed evaluation must take into account the methodical, physiological requirements of the body's recovery after effort, creating the conditions for the body to be restored after training or game efforts. One of the important signs that show maximum motor speed is the absence of any fatigue. Direct sprinting is the most dominant action when scoring goals. Thus, linear sprinting should be considered in fitness and training tests (Faude, Koch & Meyer, 2012).

Managing training workloads is crucial to enable players to perform physically at an optimal level over the course of a playing season (De Silva et al. 2018). The effort made in training and games involves increasing the motor density, resulting in a high number of high-speed game actions, offensive and defensive duels, jumps, shots at the goal etc.

The increase in speed and in particular the speed of the game implies the development of all forms of manifestation - movement, execution, reaction, but also the realization of technical procedures and game tasks at speed - passing the ball, movement of the ball and players, control of the ball, especially through games in small spaces. Training in small spaces is a significant means of increasing the indices of motor qualities, the acquisition of the technical elements specific to the football game (Stoica & Barbu, 2019).

This consideration was also demonstrated by the authors Rebelo et al. (2016), in research on strength and speed differences between 4v4 + GK and 8v8 + GK soccer games. These aspects are often achieved through the individualization of training. The individualization of technical training based on qualities and deficiencies leads to the improvement of the technical procedures required by the demands of the modern game (Barbu et al., 2015).

Modern football, due to the trends of continuous professionalization, due to its vast socialization, involves more and more components and mental processes in the preparation and the games, which become the main elements of motivation and triggering of the physical potential - attitude, motivation, emotions, feelings and passions. Football develops some motor skills at a higher level, including speed in all its forms (Buhaş et. al., 2018, Barbu, 2008).

The high volume of effort given by the specificity of the football game leads to the conclusion of the rational and economical involvement of the player, of conserving energy during the game, so that in the phases of maximum demand of each zone and position, the athlete can cope with maximum efficiency in the idea of executing individual and collective tasks as quickly as possible. The execution of technical-tactical actions with a high efficiency by a football team is conditioned by their rapid development, so at the maximum possible speed.

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