

Original Article

Analysis of the acquisition of expertise and mastery of physical skills for performing techniques by young footballers

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Abstract. There are a variety of methods and different techniques for effectively playing football. In a game, achievement of team success depends on how footballers master different techniques. Using football techniques skilfully and effectively when tackling tactical tasks during extreme conditions of playing is a crucial factor for achieving victory. In modern football, techniques are characterized by a movement system that is both practicable from the perspective of biomechanics and enables the most efficient effort to improve the accuracy and speed of playing actions. An analysis of the techniques allows an expansion of the general requirements for various characteristics and a consideration of the standard, which is the master sample that should be observed when constructing the movement system. Therefore, it is very important at the initial level that young footballers correctly acquire expertise and master physical skills to perform techniques for further professional development in football. The research objective in this study was theoretical and methodological substantiation of the acquisition of expertise and the mastering of physical skills by young footballers for performing techniques by exercising reference points of technical elements and comparing them with other exercises. The study features 41 (forty one) 9 to 10-year-old sophomore footballers from the initial training groups of Kitsman's Youth Sports School. Results: the footballers in the two groups generally had the same mastery of the techniques at the beginning of the study. However, at the end of the study, the experimental group of footballers were more competent than the control group of footballers, especially for performing accurate kicking with the inner instep and head and foot juggling.

Keywords: young footballers, techniques, reference points.

Introduction

During the training process, the prime objective during the initial training stage is to acquire general theoretical and special expertise to form the basic structure of sporting movements (Asterios Patsiaouras, 2011; Davydov V.V., 2008; Dimitrios Balasas, 2013; Maria Giannousi, 2016). The usefulness of emphasizing the formation of physical fitness and basic techniques as a basis for further sports development has been scientifically proven (Barzouka K., 2015; Filipe Manuel Clemente, 2015; Grapa Florin, 2013; Iedynak G., 2017; Raiola Gaetano, 2012; Sami Sermaxhaj, 2017; Yarmak, O., 2017).

Some scientific and instructional research studies conducted by specialists from various sports have studied the physical and technique training of athletes during the initial training stage. In particular, these include Hakman A., Nakonechniy I., Moseychuk Y., Liasota T., Palichuk Y. & Vaskan I. (2017) and Raiola Gaetano (2012) for volleyball, Kostopoulos Nikolaos (2015) for basketball, and Martin Sigmund, Michal Lehnert & Michal Kudláček (2015) for ice hockey. Nevertheless, determining the technical competence of athletes during the initial training stage and determining issues with acquiring expertise and mastering physical skills has become more and more important in football.

Traditional methodological approaches for the development of technical skills do not provide the required quality of skills for athletic performance. In practice, inconsistent and haphazard mastery of individual playing techniques occurs by forcing systematic training, which reduces the ability to master the required skills and adversely affects further athletic performance (Gianpiero Greco, 2017; Papadopoulos Andreas, 2013; Shamardin V. N., 2001). In addition, this reduces the effectiveness of technique training for young footballers. Consequently, most experts note a discrepancy between the technical competences of domestic footballers compared with the world's best players.

Methods

To pursue the research objectives, the following research methods were used: an analysis of the research and methodological literature, a pedagogical experiment, and an analysis using mathematical statistics.

Tests were used to measure and evaluate the technical competencies. To control the technical competencies of the beginner footballers, we chose the following tests: kicking with the inside of the foot, ball

trapping with the sole, kicking with the middle of the foot, kicking with the middle of the forehead and trapping a rolling ball with the inside of the foot. The performance quality was determined using a table that describes the importance of each reference point for performing the correct technique (Table 1).

Table 1. Scores for Estimating the Value of the Reference Points for Correct Performance of Each Technique

Reference Points	Score	Methodical Guidelines
Build-up	1	The build-up direction coincides with the kick direction.
Last step	1	The last step is longer, and the support leg is put half a step ahead of the shoulder.
Support	1-2	The support leg is slightly bent at the knee joint. It is put aside from the ball on the ball line and in the kick direction.
Shooting faint	1	The shooting faint is performed simultaneously with the last step.
Whip	1-2	The leg unbends at the hip joint. Then, the thigh abruptly decelerates at the moment of the vertical passage with the leg abruptly unbending at the knee joint. At the moment of the kick, the leg that performs the kick is the only hard lever.
Foot	1-2	At the moment of the kick, the forefoot performing the kick is retracted and tense.
Crunch	1	After the kick, the hand opposite to the leg performing the kick abruptly flies out forward.

In addition, the footballers were provided with test tasks to evaluate their knowledge of football techniques. The footballers were asked to identify common elements of the techniques being compared. There were a total of 10 test tasks. Each common element of the techniques being compared assigned to the footballers was equal to one point. The total score achieved by the footballer after performing 10 test tasks was recorded.

The pedagogical observation featured 41 (forty one) 9 to 10-year-old sophomore footballers from initial training groups of Kitsman's Youth Sports School. At the beginning of the study, the footballers were divided into two groups: control (n = 21) and experimental (n = 20) groups. The experimental group followed our training program, which was aimed at improving their mastery of technical elements during the initial training stage by exercising the reference points of the technical elements and comparing them with other exercises.

Results

At the beginning of the study, the footballers in both groups were evaluated in terms of their ability to acquire expertise and to master the physical skills required to perform two technical elements: kicking with the outside of the foot and ball trapping with the sole.

During the study, the footballers in both groups were evaluated in terms of their ability to acquire expertise and to master the physical skills required to perform three technical elements: kicking with the inner instep, kicking with the middle of the forehead, and trapping a rolling ball with the inside of the foot.

Our evaluation was carried out using a 10-point scale. Table 2 shows the abilities of the footballers to acquire the expertise to perform the football techniques studied.

Table 2. Results for the Control and Experimental Groups for Mastering the Techniques ($X \pm 8$) ($P < 0.001$)

Test Time	Technique	Group	Ability to Master the Techniques (Score)
Stage I	Kicking with the inside of the foot	RG (n=21)	4.88±2.92
		EG (n=20)	7.96±1.91
Stage II	Ball trapping with the sole	RG (n=21)	4.52±2.12
		EG (n=20)	7.24±1.62
	Kicking with the middle of the foot	RG (n=21)	5, No. 2.87
		EG (n=20)	8.05±1.75
Kicking with the middle of the forehead	RG (n=21)	5.32±2.12	
	EG (n=20)	7.81±1.92	
Trapping a rolling ball with the inside of the foot	RG (n=21)	6.02±2.31	
	EG (n=20)	8.25±1.23	
End of study	All techniques	6.12±2.44	5.64±2.22
		8.50±1.30	8.75±2.19

The experimental group acquired expertise in the methods required to perform football techniques, including kicking with the middle of the forehead and ball trapping with the sole. They achieved an average of 7.96 and 7.24 points, respectively, out of 10 possible points. A similar performance for the control group was observed with 4.88 and 4.52 points, respectively. The differences are statistically significant.

During the study (Stage II), the experimental group had better knowledge of the methods for performing three additional technical elements than those studied during Stage I: kicking with the inner instep, flying ball kicking with the middle of the forehead, and ball trapping with the inside of the foot (8.05, 7.81 and 8.25 points,

respectively, compared with 5.17, 5.32 and 6.02 points for the control group). The differences are statistically significant.

The ability of the footballers to acquire expertise in all five technical elements was compared at the end of the experiment. In terms of the ability to acquire the skills, the experimental group was found to have better results that were statistically significant. They scored an average of 8.75 points, whereas the control group only scored an average of 5.64 points.

The aforementioned results for the experimental group are likely due to the fact that the training was conducted in the context of preliminary formation of their full-scale orientational basis with emphasis on physical action phases and main reference points within each phase, and the footballers were focused on these areas during performance.

The second test task was used to determine the general knowledge of the football techniques. At the end of the experiment, the footballers were asked to identify common elements of the techniques. There were a total of 10 test tasks. Each element was given up to one point. The total score achieved by the footballer during the 10 test tasks was recorded.

The experimental group was more knowledgeable in the techniques with an average of 18.28 ± 3.26 for the common elements.

The control group found this task difficult to accomplish. They demonstrated an average of only 6.16 ± 2.73 for the common elements. Our findings indicate that training in football techniques as a complete movement system is quite important.

Table 3 shows the abilities of the footballers in both groups to master the techniques.

Table 3. Abilities of the Control and Experimental Groups to Master the Techniques ($X \pm 5$), ($P < 0.001$)

Test Time	Techniques	Groups	Technical Competence Performance (Score)
Stage I	Kicking with the inside of the foot	RG (n=22) EG (n=22)	5.11±2.53 7.16±1.69
	Ball trapping with the sole	RG (n=22) EG (n=22)	5.59±2.31 7.94±1.85
Stage II	Kicking with the middle of the foot	RG (n=21) EG (n=20)	5.43±2.61 8.09±1.26
	Kicking with the middle of the forehead	RG (n=21) EG (n=20)	6.78±2.20 8.33±1.25
	Trapping a rolling ball with the inside of the foot	RG (n=21) EG (n=20)	6.92±2.11 8.74±1.31
	All techniques	6.12±2.44 8.50±1.30	6.18±2.46 8.31±1.12

A comparative analysis of the data shows that the experimental group not only exhibited a better ability to acquire the skills necessary to perform the techniques but also were much more accurate in their performance during the testing. In particular, they more correctly performed the kick with the inside of the foot and the ball trapping with the sole. They scored 7.16 and 7.94 points, respectively. The control group exhibited a much lower performance according to their scores of 5.11 and 5.59 points for these actions, respectively.

Additionally, the experimental group more correctly performed the kick with the inner instep, the flying ball kick with the middle of the forehead, and the ball trapping with the inside of the foot. For these actions, they received 8.09, 8.33 and 8.74 points, respectively, compared with 5.43, 6.78 and 6.92 points, respectively, for the control group.

Upon completion of the experiment, the average score for the ability to master the techniques was significantly higher (8.31 points) for the experimental group compared with 6.18 points for the control group.

Table 4 shows the technical competencies of both the control and experimental groups. In terms of developing special dexterity (foot and head juggling) and dribbling performance, the results of the tests performed at the beginning of the study did not reveal significant differences between the control and experimental groups. Additionally, the experimental group performed the exercise "Receiving and Passing the Ball with the Inside of the Foot" better. At the end of the pedagogical experiment, the technical advantages of the experimental group over the control group became even more significant: 51.49 compared with 35.24 points for foot juggling; 27.08 compared with 15.25 points for head juggling; 5.46 compared with 7.75 points for receiving and passing the ball with the inside of the foot; 14.44 compared with 15.92 points for dribbling; 16.64 compared with 11.36 points for accuracy kicking with the inner instep; and 11.04 compared with 8.82 points for distance kicking with the middle of the forehead, respectively.

Table 4. Technical Competencies of the Control and Experimental Groups (P<0.001)

Test Time	Technique, Unit of Measure	Groups	Ability to Achieve the Task (Score)
Beginning of study	Foot juggling, times	RG (n=21)	21.24±7.06
		EG (n=20)	35.46±6.51
	Head juggling, times	RG (n=21)	10.17±3.42
		EG (n=20)	17.24±4.13
	Receiving and passing the ball with the inside of the foot, s	RG (n=21)	8.98±1.85
		EG (n=20)	7.18±1.49
	Dribbling 3 x 15 m, s	RG (n=21)	16.64±1.75
		EG (n=20)	15.38±1.41
	Accuracy kicking with the inner instep, points	RG (n=21)	7.23±1.47
		EG (n=20)	9.69±1.92
Distance kicking with the middle of the forehead, m	RG (n=21)	6.70±2.43	
	EG (n=20)	8.94±2.35	
End of study	Foot juggling, times	RG (n=21)	35.24±12.32
		EG (n=20)	51.49±12.51
	Head juggling, times	RG (n=21)	15.25±3.61
		EG (n=20)	27.08±4.69
	Receiving and passing the ball with the inside of the foot, s	RG (n=21)	7.75±1.22
		EG (n=20)	5.46±1.09
	Dribbling 3 x 15 m, s	RG (n=21)	15.92±1.62
		EG (n=20)	14.44±1.62
	Accuracy kicking with the inner instep, points	RG (n=21)	11.36±3.59
		EG (n=20)	16.64±3.12
Distance kicking with the middle of the forehead, m	RG (n=21)	8.82±2.91	
	EG (n=20)	11.04±2.17	

Prior studies, the achievements of practitioners, and our own experiments allow us to suggest the following pedagogical methods for improving the training of young footballers:

1. Improving the quality of sports selection, orientation and forecasting in football;
2. Developing up-to-date methods to master playing techniques and technologies for their implementation according to the age, gender, individual differences and existing technical competencies of young footballers
3. Appropriate material, technical and information support, implementation of interconnection and interdependence of technique training and other athletic performance components; training and competitive activities;
4. Systemic and planned use of various types of training processes based on the stages of athletic performance and individual opportunities for young footballers;
5. Improving the quality of comprehensive control, self-control and mutual control of young footballers.

Discussion

Throughout the history of development of the system of long-term training of footballers, scientists and practitioners have exerted considerable efforts to improve the training process, especially in recent years. Topical issues of athletic performance of footballers of different ages and qualifications have been addressed in studies by Fanarioti Maria (2014), Gianpiero Greco (2017), Martin Sigmund (2015) and others. The analysis of scientific and instructional literature and the generalization of best practices show that the formation of technical skills in footballers is a high-priority issue that requires viable solutions to achieve high sports success.

In a long-term training system, the process of improving physical actions is constant and infinite. It involves an active and systematic search for new ways to improve the quality of the training process for athletes. According to Gaetano Raiola (2014), Resende Rui, (2014) and others, one of the most promising areas for improving the effectiveness of the training process for qualified footballers is one that considers the individual athlete's capabilities in combination with recommended loads and requirements imposed at the present stage of training for the game. In their studies, Sami Sermaxhaj (2017), Shamardin V. N. (2001) and others state that the current methodology for technique training involving young footballers has not been sufficiently developed, and there are no objective criteria for evaluating the mastery of playing techniques during training that can be used to manage the technique training process in an effective manner. Great emphasis should be placed on mastering the techniques during the initial stage by focusing on the reference points of movements performed by young athletes.

Conclusion

This study analysed the ability of young footballers to acquire expertise and master physical skills for performing techniques by exercising reference points of technical elements and comparing them with other exercises.

Based on the results, the experimental group demonstrated a much better ability to acquire expertise and master the physical actions for all five technical elements compared with the control group, who followed the traditional program. The results can be explained by the fact that the experimental group focused primarily on the phases of physical actions and the main reference points within each phase of performing the techniques. The experimental group demonstrated a better ability to master the techniques until the end of the experiment. Evaluation of the technical competence of the control and experimental groups of footballers showed that the latter demonstrated better performance in terms of the following techniques:

Conflict of interests The authors declare that there are no conflicts of interest.

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