Model indicators of collective interactions of highly qualified football players during the game

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Abstract

The aim of the study was to determine the model indicators of highly qualified football players in the game based on a comprehensive analysis of competitive activity.

Material and methods. The study involved players from 8 leading Ukrainian football teams. A video analysis of 8 football matches of the leading teams of Ukraine was conducted. There was a pedagogical observation of the collective actions of the players. The actions of the players were recorded in a specially developed expert card. The indicators of the quantity and effectiveness of the use of various tactical actions by the players were determined. Collective interactions of football players during the game during ball possession and during the ball were recorded. The number of interactions of 2-3 players, 4-5 players, 7 or more players was determined during possession of the ball and during the selection of the ball. The number of different types of gears (short, medium, long) was also analyzed.

Results. An analysis of the competitive activity of club and national teams of high qualification allows us to state that the result of the match largely depends on the collective interactions of the players. The collective interactions of football players during the game are carried out in two phases - possession of the ball and selection of the ball. In

the phase of possession, the interaction of 2-3 players is 71.6%, 4-6 players - 24.1%, out of 7 and more players - 4.3%. In the selection phase, the interaction of 2-3 players is 63.1%, 4-6 players - 22.9%, 7 or more players - 14.0%. It was revealed that the number of ball passes during the game, which are divided: in tactical direction - holding (29.8%), developing (55, 4%), aggravating (14.8%); in range - short (58.3%), medium (30.5%), long (30.5%); in range and coordination complexity: in 1 RCS 60.9% of short, 36, 4% of medium, 27.7% of long transfers are performed; in 2 CSWs - 32.7% of short, 49.6% of medium, 27, 7% of long transfers; in 3 CSWs - 6.4% of short, 14% of medium, 15, 8% of long transfers.

Conclusions. The most important component of the collective interactions of the players is the ball passes, which are divided into tactical directions by holding (14.8%), developing (55.4%) and sharpening (14.8%).

Key words: football; transmission; team actions; tactics, technology

Анотація

Костиюкевич В.М. Модельні показники колективних взаємодій футболістів високої кваліфікації в процесі гри

Мета: на основі комплексного аналізу змагальної діяльності визначити модельні показники футболістів високої кваліфікації в процесі гри.

Матеріал і методи. У дослідженні взяли участь гравці 8 провідних команд України з футболу. Було проведено відеоаналіз 8 матчів з футболу провідних команд України. Було проведено педагогічне спостереження за колективними діями гравців. Дії гравців фіксувалися в спеціально розроблену експертну карту. Визначали показники кількості і ефективності застосування різних тактичних дій гравцями. Фіксувалися колективні взаємодії футболістів в процесі гри при володінні м'ячем і при відборі м'яча. Визначалося кількість взаємодій 2-3 гравців, 4-5 гравців, 7 і більше гравців при володінні м'ячем і при відборі м'яча. Аналізувалося також кількість різних видів передач (короткі, середні, далекі).

Результати. Аналіз змагальної діяльності клубних і збірних команд високої кваліфікації дозволяє констатувати, що результат матчу багато в чому залежить від колективних взаємодій гравців. Колективні взаємодії футболістів в процесі гри здійснюються в двох фазах - володіння м'ячем і відбору м'яча. У фазі володіння м'ячем взаємодія з 2-3 гравців складає 71,6%, 4-6 гравців - 24,1%, з 7 і більше гравців - 4,3%. У фазі відбору м'яча взаємодія з 2-3 гравців складає 63,1%, 4-6 гравців - 22,9%, 7 і більше гравців - 14,0%. Виявлено, що кількість передач м'яча протягом гри, які поділяються: по тактичній спрямованості - утримують (29,8%), розвивають (55, 4%), загострюють (14,8%); по дальності - короткі (58,3%), середні (30,5%), довгі (30,5%); по дальності і координаційної складності: в 1 РКС виконується 60,9% коротких, 36, 4% середніх, 27,7% довгих передач; у 2 РКС - 32,7% коротких, 49,6% середніх, 27, 7% довгих передач; в 3 РКС - 6,4% коротких, 14% середніх, 15, 8% довгих передач.

Висновки. Найбільш важливим компонентом колективних взаємодій футболістів є передачі м'яча, які з тактичної спрямованості поділяються на передачі утримання (14,8%), розвитку (55,4%) і загострення (14,8%).

Ключові слова: футбол; передачі; командні дії; тактика, техніка

Аннотация

Костиюкевич В.М. Модельные показатели коллективных взаимодействий футболистов высокой квалификации в процессе игры

Цель: на основе комплексного анализа соревновательной деятельности определить модельные показатели футболистов высокой квалификации в процессе игры.

Материал и методы. В исследовании приняли участие игроки 8 ведущих команд Украины по футболу. Был проведен видеонализ 8 матчей по футболу ведущих команд Украины. Было проведено педагогическое наблюдение за коллективными действиями игроков. Действия игроков фиксировались в специально разработанную экспертную карту. Определяли показатели количества и эффективности применения различных тактических действий игроками. Фиксировались коллективные взаимодействия футболистов в процессе игры при владении мячом и при отборе мяча. Определялось количество взаимодействий 2-3 игроков, 4-5 игроков, 7 и больше игроков при владении мячом и при отборе мяча. Анализировалось также количество разных видов передач (короткие, средние, дальние).

Результаты. Анализ соревновательной деятельности клубных и сборных команд высокой квалификации позволяет констатировать, что результат матча во многом зависит от коллективных взаимодействий игроков. Коллективные взаимодействия футболистов в процессе игры осуществляются в двух фазах - владения мячом и отбора мяча. В фазе владения мячом взаимодействие из 2-3 игроков составляет 71,6%, 4-6 игроков - 24,1%, из 7 и больше игроков - 4,3%. В фазе отбора мяча взаимодействие из 2-3 игроков составляет 63,1%, 4-6 игроков - 22,9%, 7 и больше игроков - 14,0%. Выявлено, что количество передач мяча в течение игры, которые разделяются: по тактической направленности - удерживающие (29,8%), развивающие (55, 4%), обостряющие (14,8%); по дальности - короткие (58,3%), средние (30,5%), длинные (30,5%); по дальности и координационной сложности: в 1 РКС выполняется 60,9% коротких, 36, 4% средних, 27,7% длинных передач; во 2 РКС - 32,7% коротких, 49,6% средних, 27, 7% длинных передач; в 3 РКС - 6,4% коротких, 14% средних, 15, 8% длинных передач.

Выводы. Наиболее важным компонентом коллективных взаимодействий футболистов являются передачи мяча, которые по тактической направленности подразделяются на удерживающие (14,8%), развивающие (55,4%) и обостряющие (14,8%).

Ключевые слова: футбол; передачи; командные действия; тактика, техника

Introduction

Model indicators of competitive activity are an effective tool for managing the training of athletes is to demonstrate their level of skill in the conditions of fierce competition [1, 2]. No matter how high the physical readiness and functional readiness of athletes are, as well as their potential capabilities, the main values will always be the parameters of competitive activity, which to the greatest extent reflect the results of the entire development system of a particular sport [3, 4].

For team game sports, including football, important components are not only individual, but also collective indicators of competitive activity [5, 6, 7]. First of all, this is due to the very structure of competitive activity in team game sports, in which the sporting result, as a rule, is ensured by the effective interaction of players in different phases of the game [8, 9].

The problem of analyzing the competitive activity of athletes in team game sports, taking into account individual, group and team indicators, was studied [10, 11]: in basketball – Bezmylov, Shinkaruk [7], Mitova [6], Doroshenko [7]; in volleyball – Schepotina [12], Doroshenko [1]; in field hockey – Fedotova [10], Kostyukovich [3, 13].

An analysis of the literature [14, 15, 16] allowed us to conclude that the most comprehensively identified problem was investigated in the process of competitive activity of highly qualified football players [17, 18, 19]. At the same time, it should be noted that these studies were carried out without taking into account the interactions of players in two phases of the game – ball selection and possession.

The aim of the study was to determine model indicators of collective interactions of highly qualified football players in the game based on a comprehensive analysis of competitive activity.

Material and methods

Participants

The study involved players from 8 leading Ukrainian football teams. A video analysis of 8 football matches was conducted.

Procedure

There was a pedagogical observation of the collective actions of the players. The actions of the players were recorded in a specially developed expert

card. The indicators of the quantity and effectiveness of the use of various tactical actions by the players were determined. Collective interactions of football players during the game during ball possession and during the ball were recorded. The number of interactions of 2-3 players, 4-5 players, 7 or more players was determined during possession of the ball and during the selection of the ball.

Methodological foundations of the analysis of collective interactions

Through a systematic analysis of the literature, the relevance of the study was identified, the scientific search for a solution to the problem was determined. In the process of pedagogical observation, a video analysis technique was developed for the competitive activity of football players [2, 16, 20].

For effective management of a football team in a competition, important informational criteria for analyzing a game are not only individual indicators of football players, but also their collective interactions.

It is much more difficult to control the collective interactions of players during the game than individual actions. There are several reasons for this.

Firstly, during a football match, game situations very often change, both in the phases of the game (the ball possession phase and the ball selection phase), as well as the complexity of the actions performed and their game tension. Therefore, it is quite difficult to determine game situations in which one or a group of team players took part.

Secondly, each team has its own style of playing the game, certain tactics, the current result of the game, which determines the behavior of the players, etc. All this also complicates the expert's work on determining a specific group of players who participate in a particular game episode.

Thirdly, the higher the class of the team, the more players take part in the drawing of certain combinations. In this regard, it is difficult to disagree with the famous Canadian coach Scotty Bowman, who said: "Almost all the players on the court should take part in the cool team in attacking and defensive actions."

Fourth, control and subsequent analysis of collective and team interactions should be carried out taking into account the general attitude to the game and specific tasks for players of different roles. Therefore, experts (researchers) should have information about the content of the installation on the game.

Monitoring and analysis of collective interactions of players was carried out in two main directions, each of which is characterized by certain aspects.

In the possession phase:

- ☐ tactical scheme of the team;
- ☐ putting the ball in from the goal;
- ☐ exit from the zones of sector A (the field

was conditionally divided into four sectors: sector A - from the front line to the lines of the penalty area; sector B - from the line of the penalty area to the center line of the field; sector B - from the center line of the field to the line of the opponent's penalty area ; sector Г - from the line of the opponent's penalty zone to the front line of half of the opponent's field);

☐ interaction of players in the areas of sectors B and C;

☐ interaction of players in the areas of sector G;

☐ drawing of standard provisions in the areas of sector G;

☐ drawing of penalty and corner kicks;

☐ number and duration of collective interactions;

☐ the effectiveness of collective and team interactions.

In the ball selection phase:

☐ tactical arrangement of players in the ball selection phase;

☐ characteristics of control over the movements of players of the opposing team (personal play throughout the field or in certain areas, tight guardianship of players, free ball reception, etc.);

☐ application of pressure (how many players participate in the pressure and in what areas of the field is carried out);

☐ interaction system in the ball selection phase (personal, zone, mixed);

☐ ball selection methods (selection, interception, inaccurate play of an opponent);

☐ the ratio of selections and interceptions of the ball in different zones of the field;

☐ the effectiveness of collective and team interactions.

Registration of collective interactions was carried out in the course of direct pedagogical observation of the game (indicators are recorded on the recorder) and analysis of the video of the match. The data obtained were recorded in a special expert map (table. 1).

In addition to registering quantitative and qualitative collective interactions, it is important to analyze the content of these interactions, which characterizes the team's playing style, which in turn can be used to judge its class.

Analysis of the content of collective interactions should be based on the main tasks that the team solves during the game.

In the ball possession phase, these tasks will be:

☐ putting the ball in from the goal and leaving the zones of sector A (in the case of pressure from the opposing team) in order to organize an attack;

☐ the ball in the middle sectors of the field, with the aim of organizing the development of attacking actions;

☐ the ball in sectors G with the goal of transferring the ball to the opponent's penalty area and completing attacking actions.

Table 1

Expert map of pedagogical observation of the collective interactions of the players of the team _____ in the match with the team _____

_____ "_____" _____ 20 _____
(name of competition)

Ball phase				Ball taking away Phase			
N	Interaction Metrics	quantity	CE	N	Interaction Metrics	quantity	CE
Tactical patterns of player interaction, for example:				Tactical patterns of player interaction, for example:			
1.	1-4-4-2 1-3-4-3 1-4-5-1			1.	1-5-4-1 1-4-4-2 1-5-3-2 1-3-3-4		
Out of sector A zones (number of players):				Controlling Opponent Players:			
2.	- cast: 2-3 4-6 >6			2.	- personal across the field; - personal in zones G V B		

		A	
- transfer the ball to the flank: 2-3 4-6 >6		- personalized individual players; - free (there is the possibility of free ball reception)	
- transfer the ball to the opposite flank: 2-3 4-6 >6			
- transfer of the ball to the zones of sectors B, C, D: 2-3 4-6 >6			
Interactions in sectors B and C (number of players):		Pressure (number of players) in the zones of the sectors:	
3.	2-3 4-6 >6	3.	G V B A
Interactions in sectors G (number of players):		Player interaction system: - personal	
4.	2-3 4-6 >6	4.	- zone - mixed
General player interactions:		Interception of a ball (number of players):	
5.	2-3 4-6 >6	5.	2-3 4-6 >6
Interaction duration (s):		Ball taking away (number of players): 2-3	
6.	8 16 24 >24	6.	4-6 >6

Note. CE - efficiency coefficient

Statistical analysis

Analysis of the research results was carried out on the basis of mathematical statistics methods. For processing empirical data, the computer program Statistica10.0 (Statsoft, USA) and MS Excel 2007 were used.

During the study, the competitive activity of club and national football teams in various competitions was analyzed.

Results

For effective management of a football team during the competition, important informative

criteria for analyzing the game are not only individual indicators of the players, but also their collective interactions. In modern football, individual actions of players are carried out in two phases of the game: in the phase of possession and in the phase of selecting the ball (Table 2). In the ball possession phase, the team controls the ball through 2-3 players on average 98.8 times (71.6%), 4-6 players - 33.3 times (24.1%) and 7 or more players - 5, 6 times (4.3%). When fixing collective interactions when mastering the ball, it is quite difficult to determine the group of players that directly participated in the selection or interception of the ball.

Table 2

Collective interactions of football players during the game (average data, n = 8)

Ball phase			Ball taking away Phase		
Interaction	Total	%	Interaction	Total	%
2-3 players	98,8	71,6	2-3 players	39,1	63,1
4-6 players	33,3	24,1	4-6 players	14,2	22,9
7 and more players	5,8	4,3	7 and more players	8,7	14,0

As a rule, players participating in the safety net, pressing, interacting under standard provisions, including creating an artificial offside position, are recorded. On average, for a game of highly qualified teams the selection (interception) of the ball is carried out by 2-3 players 33.1 times (63.1%), 4-6 players - 14.2 times (22.9%) and 7 or more players 8.7 times (14.0%).

The given indicators of collective interactions of football players do not significantly differ from the data of Lisenchuk [17]. In the table. Figure 3 shows the reference and average model levels of collective interactions of football players. The reference level provides for the team to complete a total of 146 interactions during the game, of which 94 to 3 players, 44 to 6 players and 8 to more than 7 players.

If we consider the collective interactions of the players in the phase of possession, then the main tool for such interactions is the transfer of the ball. The structure of ball passes performed by highly qualified football players is presented in Table. 4.

Table analysis 4 indicates the following:

1. In a tactical orientation, retention gears are 29.8%, developing gears are 55.4%, and aggravating gears are 14.8%.

2. In terms of short gear range, 58.3%, medium - 30.5% and long 11.2% are performed.

3. In terms of range and coordination complexity: 60.9% of short, 36.4 medium and 56.5% of long transmissions are performed in 1 RCS, 32.7% of short, 49.6% medium and 15.8% in 2 RCS long gears.

Table 3

Model characteristics of collective interactions of football players [17]

Specifications	Level	
	reference	averaged
Interaction:	146	134
small group (up to 3 people)	94	86
group average (up to 6 people)	44	37
team (over 7 people)	8	11
Piercing attack	48	37
Acute moment	21	16

In collective interactions, one-touch transfers are a very effective means (Table 5). According to S. Golomazov and B. Chirva (1999), the total number of one-touch transmissions among the strongest teams of the 1998 CM ranged from 95 (Holland) to 75 (Croatia). The greatest one-touch passes directed towards the opponent's penalty area

were in the French team - 42 with an efficiency of 58%, which, to some extent, explains why the French team became the world champion.

The collective interaction of players is carried out in the attacking actions of a team of two types - positional attack and quick attack.

The structure of the programs performed by highly qualified football players (average data), %

Notes: 1, 2, 3 - modes of coordination complexity

According to [1], the positional attacks of the Dnipro team (Dnipro) amounted to 15.4% (18 times) of the total number of attacks, fast attacks made 84.6% (98 times). At the same time, the effectiveness of positional attacks was significantly lower (4.7%) than fast attacks (14.2%). This is due, first of all, to the fact that when organizing a quick attack, the opponent does not have time to switch to the phases

of possession of the ball in time, when the players focused their efforts on attacking actions, on attacking actions, on the ball selection phase, which usually requires the movement of players in the side of their goal, parsing the opponent's players and securing the partner who is taking the ball. Thus, if the team that mastered the ball so quickly carries out their attacking actions that during this period the players of the opposing team do not have time to rearrange their actions for selection or interception, then it has real chances to successfully complete its quick attack.

Indicator of the volume and effectiveness of one-touch transmissions by players of the strongest national teams in 1998 World Cup matches, average per game [17]

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The effectiveness of the collective interactions of football players during the game is largely determined by the class of the team, its ability to accept various tactical models of the game not only in different, but also in one specific match.

According to many football experts, the more players are involved in a particular game combination, the higher the level of the team [16, 21, 22, 23]. One of the key components in the structure of a football team's game is ball passes, which in football are subdivided in range, trajectory, and direction [8, 17, 21]. In our study, we also considered the transfer of the ball in a tactical direction - holding, with the goal of holding the ball, developing teams to develop attacking actions and sharpening, which are performed in the pre-final stage of penetrating attacks.

Unlike other studies, we evaluated each tactical collective interaction of players based on psychological and coordination complexity. If tactical interaction was carried out on the spot or at a convenient speed of movement of the players, then we attributed this interaction to the 1st mode of coordination complexity. The implementation of tactical interactions in movement with a limitation in space and time related to the 2nd mode of coordination complexity, and under conditions of active interference from the opponent to the 3rd mode of coordination complexity.

Thus, in our study, on the one hand, methodological approaches to the analysis of the collective interactions of football players Bazilevich [8], Godik [14], Lisenchuk [17], Batista [11], Van

Gool, Van Gerken [18], Benk were confirmed [22] and, on the other hand, we gained new knowledge about these interactions, taking into account the tactical preparedness and coordination complexity of such tactical episodes as passing the ball.

Conclusions

1. For purposeful management of the training process by a highly qualified football player, it is necessary to focus on model indicators of both individual and collective parameters of the players' competitive activity during the match.

2. It has been revealed that an important component in the structure of collective interactions of football players is ball passes, which are divided: in terms of tactics - holding (29.8%), developing (55, 4%), aggravating (14.8%); in range - short (58.3%), medium (30.5%), long (30.5%); in range and coordination complexity: in 1 RCS 60.9% of short, 36, 4% of medium, 27.7% of long transfers are performed; in 2 CSWs - 32.7% of short, 49.6% of medium, 27, 7% of long transfers; in 3 CSWs - 6.4% of short, 14% of medium, 15, 8% of long transfers.

Further research on the identified problem will be aimed at determining model indicators of interaction between players of different roles in the match.

Conflict of interest

Authors state that there is no conflict of interest.

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