Relationship between quantitative indicators of motor actions and technical and tactical indicators in young football players 13-14 years of different playing roles

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Abstract

Purpose. To determine the relationship between individual motor exercises and the quality of the technical and tactical actions of young football players of 13-14 years of different playing roles.

Materials and methods: the study was conducted during a football competition. The study involved 11 football players 13-14 years old. Physical actions were analyzed during 10 games of the Kharkov football championship. The individual characteristics of young athletes in terms of diagnostics are analyzed, a statistical analysis of the degree of influence of various parameters of movements was carried out and relationship of indicators was carried out.

Results. Our correlation analysis results allow us to take into account the influence of individual exercises on the performance of technical and tactical actions of young football players of 13-14 years of different playing roles when building the training process.

Conclusions. The conducted correlation analysis of the indicators of special motor actions and indicators of technical and tactical indicators of young football players of 13-14 years of different playing roles determined that in the wing back defenders there is a more relationship between jerks at 15-20 m and dribbling; central defenders have established average correlation between the amount of jerking at 15-20 m and the quality of performing short, medium and long ball passes; in wing back midfielders, the implementation of the number of jerks by 15-20 m affects all we study motor actions; in central midfielders the performance of the number of jerks affects the performance of short, medium and long passes; for forwards, a more correlation between technical and tactical actions is established between the number of types of movements and tackles, including head games.

Further research will be aimed at developing complexes of exercises of special physical preparation, taking into account the influence on the performance of technical and tactical actions of young players 13-14 years of different playing roles.

Key words: correlation; quantitative indicators of motor actions; technical and tactical indicators

Wissija: Relationship between quantitative indicators of motor actions and technical and tactical indicators of young football players of 13-14 years of different playing roles

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Introduction

The popularity of football is well known, since millions of children and adults are involved in this sport. In Ukraine, despite a significant enthusiasm for football, experts pay attention to the significant gap between the players of leading Ukrainian clubs and the best Ukrainian world and European teams in individual technical, tactical and physical training [1, 2, 3, 4].

Many authors have studied issues related to the construction of the training process of football players of different groups: young football players [4, 5, 6, 7]; highly qualified football players [8, 9, 10, 11]; old-timers football players [12, 13].

The studies presented in the available literature, the technical and tactical actions and motor qualities that are inherent for players of all ages [14, 2, 4, 15] and the playing role [1, 8, 6, 13, 10, 16], are presented. At the same time, the indicated works do not take into account the features of the game actions of the defenders (separately wing back and central) and midfielders (wing back and central), which have different functions. In addition, it is precisely at the age of 13-14 that the game functions are mainly determined, the implementation of which requires the manifestation of individual motor qualities. In this connection, it is advisable to determine the influence of motor actions (their quantitative indicators) on the performance indicators of the technical and tactical actions of young football players of 13-14 years old during the game, and are presented in our work.

Our correlation analysis results allow us to take into account the influence of the use of individual exercises on the performance of technical and tactical actions of young football players of 13-14 years of different playing roles when building the training process.

Further research will be aimed at developing complexes of exercises of special physical preparation, taking into account the impact on the performance of technical and tactical actions of young players 13-14 years of different playing roles

Purpose: to determine the relationship between individual motor exercises and the quality of the technical and tactical actions of young football players of 13-14 years of different playing roles.

When planning a training process that uses a variety of exercises, it is important to consider their impact on the implementations of technical and tactical actions. Preliminary studies have determined that the performance of motor and technical and tactical actions for young football players 13-14 years old and the same for players of different playing roles. Therefore, we carried out a correlation analysis in which the relationship of individual motor actions, the quantity and quality of the technical and tactical actions of players of all playing roles, which are presented in Table 1, are determined.

**Table 1**

| N | Motor actions, quantity | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  |
|---|------------------------|----|----|----|----|----|----|----|----|----|
| 1 | Jerks 15-20            | 0.52* | 0.48* | 0.31 | -0.51* | 0.53* | 0.26 | 0.18 | 0.48* | 0.31 |
| 2 | 40-50m acceleration    | 0.26 | 0.50* | 0.48* | -0.50* | 0.51* | 0.23 | 0.15 | 0.46* | 0.26 |
| 3 | Running backwards      | 0.40 | 0.38 | 0.26 | -0.56* | 0.36 | 0.48* | 0.26 | 0.28 | 0.21 |
| 4 | Cross-step running     | 0.42 | 0.31 | 0.28 | -0.52* | 0.40 | 0.32 | 0.17 | 0.26 | 0.28 |
| 5 | Shuffle running        | 0.39 | 0.30 | 0.21 | -0.54* | 0.44 | 0.30 | 0.11 | 0.27 | 0.36 |
| 6 | Tackle                 | 0.40 | 0.32 | 0.54* | -0.56* | 0.52* | 0.41 | 0.46* | 0.51* | 0.48* |
| 7 | Head game              | 0.41 | 0.38 | 0.51* | 0.30 | 0.28 | 0.21 | 0.18 | 0.15 | 0.65* |
| 8 | Throw-in               | 0.28 | 0.21 | 0.20 | 0.26 | 0.20 | 0.15 | 0.30 | 0.16 | 0.30 |
| 9 | Jumping                | 0.46* | 0.47* | 0.50* | 0.36 | 0.32 | 0.36 | 0.28 | 0.15 | 0.56* |
| 10| Number of runs per game, m. | 0.48* | 0.51* | 0.56* | -0.55* | 0.54* | 0.31 | 0.38 | 0.30 | 0.56* |

Notes: * - reliability of the correlation coefficient p<0.05.
1 – short pass; 2 - medium pass; 3 - long pass; 4 - groundmoves;
5 - dribbling; 6 - slide tackle; 7 - ball stop; 8 - kicks to the goal;
9 – headshot

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Wing back defenders carry out the largest actions associated with short and medium passes of the ball, which are interconnected with quantitative indicators of jerking 15-20 (r=0.52; 0.48), jumping (r=0.46; 0.47) and the total number of runs per game (r=0.48; 0.51). The number of jerks performed 15-20m also affects the groundmoves parameters (r=0.51), dribble (r=0.53) and the number of kicks to the goal (r=0.48).

The number of performed accelerations at 40-50 m, which e wing back defenders carry out in modern football, has an average level of correlation with medium and long passes of the ball (r = 0.50; 0.48) and groundmoves (r=0.50) and dribble (r=0.51). When tackling and groundmoves, the wing back defenders use various movements that correlate with backwards running (r=0.56), a cross-step running (r=0.52) and shuffle running (r=0.54), which affects on tackles (r=0.56).

The total number of runs which wing back defenders performing per game affects on the number of performing short (r=0.48), medium (r=0.51) and long (r=0.56) ball passes, groundmoves (r=0.55) and dribble (r=0.54).

Central defenders to a greater extent take part in tackles (21.5%), the implementation of which further affects the performance of short (r=0.50), medium (r=0.52) and long (r=0.56) passes, as well as groundmoves (r=0.54) and execution of headshots (r=0.52). In addition, the performance of short and medium passes correlates with the performance of jerks by 15-20 m (r=0.50; -0.54) (Table 2). It should also be noted that the total number of runs per game affects the quality and quantity of passes, especially medium (r=0.54) and long (r=0.58) and head games (r=0.58). Qualitative and quantitative performance of ball passes is interconnected: with backwards running (short - r=0.46; medium - r=0.50; long - r=0.48) with cross-step running (r=0.48; 0.46; 0.48) with a shuffle running (r=0.51; 0.46) (Table 2).

### Table 2

| N   | Motor actions, quantity  | Technical and tactical actions, quality |
|-----|--------------------------|----------------------------------------|
|     |                          | 1         | 2         | 3         | 4         | 5         | 6         | 7         | 8         | 9         |
| 1   | Jerks 15-20              | -0.50*    | -0.52*    | -0.54*    | 0.27      | 0.48*     | 0.38      | -0.52*    | 0.42      | -0.56*    |
| 2   | 40-50m acceleration       | -0.52*    | -0.56*    | -0.53*    | 0.21      | 0.18      | 0.26      | 0.33      | -0.52*    | -0.54*    |
| 3   | Running backwards         | 0.46      | 0.50*     | 0.48*     | 0.56*     | 0.42      | 0.37      | 0.40      | 0.24      | -0.48*    |
| 4   | Cross-step running        | 0.48*     | 0.46      | 0.48*     | 0.52*     | 0.38      | 0.51*     | 0.28      | 0.30      | -0.52*    |
| 5   | Shuffle running           | 0.51*     | 0.46      | 0.32      | 0.58*     | 0.37      | 0.48*     | 0.22      | 0.36      | -0.56*    |
| 6   | Tackle                   | 0.50*     | 0.52*     | 0.56*     | 0.54*     | 0.32      | 0.46*     | 0.21      | 0.34      | -0.52*    |
| 7   | Head game                | 0.55*     | 0.56*     | 0.51*     | 0.36      | 0.26      | 0.11      | 0.14      | 0.21      | -0.68*    |
| 8   | Throw-in                 | 0.11      | 0.09      | 0.14      | 0.11      | 0.10      | 0.12      | 0.14      | 0.09      | 0.10      |
| 9   | Jumping                  | 0.56*     | 0.50*     | 0.24      | 0.14      | 0.36      | 0.28      | 0.18      | 0.38      | -0.63*    |
| 10  | Number of runs per game, m.| -0.51*    | -0.54*    | -0.58*    | 0.30      | 0.28      | 0.14      | 0.10      | 0.36      | -0.63*    |

Notes: * - reliability of the correlation coefficient p<0.05.
1 - short pass; 2 - medium pass; 3 - long pass; 4 - groundmoves; 5 - dribbling; 6 - slide tackle; 7 - ball stop; 8 - kicks to the goal; 9 - headshot

Thus, for high-quality performance of basic actions by central defenders, it is necessary to increase the level of performing of the running varieties used during the game, preceding subsequent actions (first of all, passing the ball at different distances). It should be noted that wing back midfielders and wing back defenders in many respects perform the same technical and tactical actions associated with various running movements, carried out both during defense and in attack.

The wing back midfielders perform a large amount of technical and tactical actions related to quantitative indicators of running per game (33.6%). Therefore, the overwhelming number and quality of technical and tactical indicators depends on physical activity during the game, namely: short, medium and long passes (r=0.59; 0.60; 0.64), groundmoves (r=0.58), dribbling (r=0.54), tackling (r=0.46), slide tackle (r=0.48), kicking to the goal by foot (r=0.51) and head (r=0.52) (Table 3). Also, wing back defenders take part in a large number of tackles, which affect the quality of all types of passes (r=0.52; 0.50; 0.51), groundmoves (r=0.56), dribbling (r=0.46), tackles (r=0.54), kicks by foot and heads to the goal (r=0.51; 0.52) (Table 3).
Table 3

Correlation matrix between the quantitative indicators of motor actions and the technical and tactical indicators of wing back midfielders 13-14 years old

| N  | Motor actions, quantity | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    |
|----|------------------------|------|------|------|------|------|------|------|------|------|
| 1  | Jerks 15-20            | -0.54*| -0.56*| -0.58*| -0.51*| -0.60*| -0.51*| -0.41*| -0.51*| -0.50*|
| 2  | 40-50m acceleration    | 0.52*| 0.42  | 0.36  | 0.36  | 0.38  | 0.48*| 0.32  | 0.54*| 0.52*|
| 3  | Running backwards      | 0.42  | 0.30  | 0.24  | 0.54*| 0.36  | 0.47*| 0.26  | 0.53*| 0.51*|
| 4  | Cross-step running     | 0.51*| 0.36  | 0.22  | 0.52*| 0.31  | 0.48*| 0.11  | 0.43  | 0.57*|
| 5  | Shuffle running        | 0.50*| 0.32  | 0.26  | 0.51*| 0.32  | 0.49*| 0.14  | 0.45  | 0.50*|
| 6  | Tackle                 | 0.52*| 0.50  | 0.51*| 0.56*| 0.46*| 0.54*| 0.17  | 0.51*| 0.52*|
| 7  | Head game              | 0.51*| 0.51*| 0.40  | 0.41  | 0.40  | 0.18  | 0.12  | 0.41  | 0.61*|
| 8  | Throw-in               | 0.48*| 0.47  | 0.50*| 0.21  | 0.19  | 0.12  | 0.41  | 0.37  | 0.51*|
| 9  | Jumping                | -0.52*| -0.53*| -0.54*| 0.50*| 0.46*| 0.26  | 0.28  | 0.49*| 0.65*|
| 10 | Number of runs per game, m.| 0.59*| 0.60*| 0.64*| 0.58*| 0.54*| 0.46*| 0.48*| 0.51*| 0.52*|

Notes: * - reliability of the correlation coefficient p<0.05.
1 – short pass; 2 - medium pass; 3 - long pass; 4 - groundmoves; 5 - dribbling; 6 - slide tackle; 7 - ball stop; 8 - kicks to the goal; 9 - headshot

For central midfielders, inherent actions are associated with tackles (20.8%) and the implementation of a significant number of short (14.6%) and medium (16.2%), which is performed on a large number of motor actions per game (34.2%). The technical and tactical actions of the central midfielders have an average level of correlation with the performance of jerks by 15-20 m: short, medium and long passes of the ball (r=0.50; 0.53; 0.55),
groundmoves and dribbling (r=0.51; 0.48), by kicking the ball with the foot into the goal (r=0.56) and the head (r=0.52) (Table 4). The number of tackles correlates with the subsequent performance of technical and tactical actions: short, medium and long passes of the ball (r=-0.52; -0.54; -0.56),
groundmoves and dribbling (r=-0.52; -0.48), the quality of the tackles performance (r=-0.51), kicking in the goal (r = -0.58), headshot (r=-0.56) (Table 4).

Table 4

Correlation matrix between the quantitative indicators of motor actions and the technical and tactical indicators of central midfielders 13-14 years old

| N  | Motor actions, quantity | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    |
|----|------------------------|------|------|------|------|------|------|------|------|------|
| 1  | Jerks 15-20            | 0.50*| 0.53*| 0.55*| 0.51*| 0.48*| 0.37  | 0.48*| 0.56*| 0.52*|
| 2  | 40-50m acceleration    | 0.51*| 0.48*| 0.32  | 0.22  | 0.19  | 0.48*| -0.51*| -0.53*| -0.49*|
| 3  | Running backwards      | 0.21  | 0.16  | 0.55*| 0.53*| 0.51*| 0.41  | 0.26  | 0.50*|       |
| 4  | Cross-step running     | 0.20  | 0.22  | 0.22  | 0.58*| 0.50*| 0.52*| 0.32  | 0.30  | 0.53*|
| 5  | Shuffle running        | 0.53*| 0.53*| 0.58*| 0.61*| 0.58*| 0.48*| 0.51*| 0.50  | 0.52*|
| 6  | Tackle                 | -0.52*| -0.54*| -0.56*| -0.52*| -0.48*| 0.51*| 0.28  | -0.58*| -0.56*|
| 7  | Head game              | 0.44  | 0.52*| 0.58*| 0.26  | 0.24  | 0.20  | 0.23  | 0.40  | 0.65*|
| 8  | Throw-in               | 0.16  | 0.11  | 0.14  | 0.15  | 0.11  | 0.10  | 0.36  | 0.17  | 0.62*|
| 9  | Jumping                | 0.50  | 0.50*| 0.52*| 0.15  | 0.26  | 0.24  | 0.20  | 0.45  | 0.64*|
| 10 | Number of runs per game, m.| -0.48*| -0.52*| -0.56*| -0.50*| -0.52*| -0.51*| -0.48*| -0.51*| -0.53*|

Notes: * - reliability of the correlation coefficient p<0.05
1 – short pass; 2 - medium pass; 3 - long pass; 4 - groundmoves; 5 - dribbling; 6 - slide tackle; 7 - ball stop; 8 - kicks to the goal; 9 - headshot

The total number of runs carried out per game affects all performance indicators of technical and tactical actions, reducing their quantity and quality (r=-0.48; -0.56).
Correlation matrix between the quantitative indicators of motor actions and the quality of the technical and tactical actions of forwards

| N     | Motor actions, quantity | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     |
|-------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1     | Jerks 15-20             | 0.52* | 0.46* | 0.18  | 0.56* | 0.54* | 0.20  | 0.51* | 0.56* | 0.55* |
| 2     | 40-50m acceleration     | 0.54* | 0.20  | 0.15  | 0.41  | 0.50* | 0.36  | -0.46* | -0.55* | -0.50* |
| 3     | Running backwards       | 0.51* | 0.48* | 0.36  | 0.55* | 0.24  | 0.48* | 0.50*  | 0.52*  | 0.51* |
| 4     | Cross-step running      | 0.50* | 0.49* | 0.27  | 0.52* | 0.54* | 0.46* | 0.48*  | 0.50*  | 0.50* |
| 5     | Shuffle running         | 0.21  | 0.16  | 0.12  | 0.54* | 0.46* | 0.48* | 0.36   | 0.37   | 0.46* |
| 6     | Tackle                  | -0.52*| -0.54*| -0.55*| -0.52*| -0.54*| -0.53*| -0.49*| -0.57*| -0.56*|
| 7     | Head game               | 0.31  | 0.56* | 0.53* | 0.51* | 0.47* | 0.21  | 0.26   | 0.31   | 0.58* |
| 8     | Throw-in                | 0.16  | 0.12  | 0.15  | 0.20  | 0.18  | 0.12  | 0.52*  | 0.52*  | 0.56* |
| 9     | Jumping                 | 0.46* | 0.41  | 0.35  | 0.42  | 0.38  | 0.42  | 0.48*  | 0.36   | 0.58* |
| 10    | Number of runs per game, m. | 0.32  | 0.40  | 0.52* | 0.57* | 0.54* | 0.36  | 0.50*  | -0.57* | -0.59* |

Notes: * - reliability of the correlation coefficient p<0.05.
1 – short pass; 2 - medium pass; 3 - long pass; 4 - groundmoves; 5 – dribbling; 6 - slide tackle; 7 - ball stop; 8 - kicks to the goal; 9 – headshot

The forwards take part in a large number of tackles (26,1%) after which they carry out passes, mainly short ones and kicks and heads to the goal, which correlate with tackles (r=0.52; 0.57; 0.56). It should be noted that the forwards carried out backwards running (5,8; 3,0%) and cross-step running, which correlates with the subsequent use of short ball passes (r=0.51; 0.50). Quantitative indicators of running per game affect the performing of long passes (r=0.52), groundmoves (r=0.57), dribbling (r=0.54) and a headshot into the goal (r=0.59) (Table 5).

**Discussion**

There are several scientific studies that address the issue of quantitative indicators of motor actions [2, 9, 10] and technical and tactical indicators [3, 5, 11] for players of different ages and playing roles. Along with this, questions are considered regarding to improving the technical and tactical actions of players by increasing the level of development of motor qualities [3, 10, 12, 19]. It also discusses the actions of individual players, both during training and during the game, which requires the universalization of the actions of individual players. Therefore, it is advisable to determine the game criteria that are inherent in football players of various game roles and conduct the training process with the improvement of motor qualities and technical tactics of other actions, which will improve the quality of the educational process of young football players 13-14 years old.

At the same time, there is a significant difference in the performance of the game functions of the wing back and central defenders and midfielders. So, the actions of wing back defenders and midfielders have the same actions for protective functions when performing a large amount of motor actions. Along with this, the central defenders of the motor activity associated with the implementation of jerks ahead and the preforming of the first passes for further attacking actions. Central midfielders carry out a large volume of aerobic and anaerobic motor actions when performing technical and tactical decisions on which the attacking activity of the team depends [23, 24].

As a result of the studies, a different level of correlation in the wing back and central defenders and midfielders was established, which correspond to the game functions of each of them during the game. Thus, in order to develop individual training programs for players of all playing roles, it is necessary to distinguish between motor and technical and tactical actions of the wing back and central defenders and midfielders. Therefore, the study of the relationship between individual motor actions and the implementation of technical and tactical actions of players of different game roles allows the development of additional special exercises for young football players 13-14 years old.

Therefore, the conducted correlation analysis between indicators of motor qualities and technical and tactical actions revealed an average level of interconnection of their individual components that have their own characteristics depending on the playing role.

| Table 5 |
Conclusions

1. The conducted correlation analysis of indicators of special motor actions and technical and tactical indicators of young football players of 13-14 years of different playing roles. Shown: in wing back defenders, the greatest correlation is defined between 15–20 jerking and dribbling (r=0.53), backwards running, cross-step running and tackles and groundmoves (r=0.56; r=0.56; r=0.56) the number of runs per game affects the performance of medium and long passes of the ball (r=-0.51; r=-0.56), groundmoves (r=0.55), dribbling (r=0.54) and headshots (r=0.56); in central defenders established average correlation between the amount of jerking by 15-20 and the quality of performing short, medium and long ball passes (r=-0.50; -0.52; -0.54) and stopping the ball (r=-0.52) accelerations at 40-50 m and the quality of the passes (r=-0.52; -0.56; -0.53), kicks to the goal (r=-0.52) and head hits (r=-0.56). Groundmoves correlate with backwards running (r=0.56), Cross-step running (r=0.52), Shuffle running (r=0.58), tackles (r=0.54). The total number of runs per game affects the performance of short, medium, and long passes (r=-0.51; -0.54; -0.58) and headshots (r=-0.63).

2. Revealed: in wing back midfielders, the implementation of the number of jerks by 15-20 affects all we examine motor actions (r=-0.41; -0.60), along with this, the number of jumps correlates with the performance of short, medium and long passes of the ball (r=-0.52; -0.53; -0.54), as well as the number of jumps and headshots; in central midfielders, the performance of the number of jerks affects on the performance of short, medium and long passes (r=-0.50; -0.53; -0.55), as well as the performance of a cross-step running and participation in tackles affects the performance of almost all technical and tactical actions (r=-0.50; -0.61); in forwards, the most correlation of technical and tactical actions is established between the number of types of running movements and tackles, including head games (r=0.41; -0.61). The results obtained allow us to take into account, when planning the training process, the impact of using individual special exercises on the quality of the technical and tactical actions of young football players 13-14 years old.

Conflict of interest

Authors state that there is no conflict of interest.

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