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THE EFFECTS OF THE TRAINING IN THE PREPARATION PERIOD ON THE COORDINATION TRANSFORMATION WITH FOOTBALL PLAYERS U16

UČINKI TRENINGA V OBDOBJU PRIPRAV NA SPREMEMBO KOORDINACIJE PRI NOGOMETAŠIH KADETIH

ABSTRACT

The main aim of the research was to identify a level of quantitative changes of the coordination with fifteen years old football players under the influence of the programmed football training of a six weeks preparation period. The training programme covered forty-four training units. The research was made on a sample of 120 cadet level football players. To estimate the coordination three tests have been used: Eight with bending, Steps aside and Legs slalom off with two balls. In the area of comparative statistics, we used discriminant parametric procedure t-test for big paired samples. **It can be concluded that there are statistically significant differences in all three variables to estimate the coordination. This confirmed the hypothesis that the expected significant positive quantitative changes of coordination influenced by the proposed model of training in preparation period with fifteen years old football players. The authors were guided by the fact that this kind of training program in preparation period is very effective in terms of raising the coordination level with fifteen years old. The obtained results can be directed towards innovation plans and programs in the preparation period, and the adaptation of the same needs of the respective population.**

Key words: football, preparation period effects, coordination

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IZVLEČEK

Glavni cilj raziskave je bil odkriti raven kvantitativnih sprememb v koordinaciji pri petnajstletnih nogometaših, ki so opravili program nogometnih treningov v obdobju šesttedenskih priprav. Program treningov je obsegal 44 vadbenih enot. Raziskava je bila opravljena na vzorcu 120 nogometašev kadetov. Za oceno koordinacije smo uporabili tri teste: test osmice s pregibom, test koraki vstran in test slalom z dvema žogama. V okviru primerjalne statistike smo uporabili diskriminantni parametrični t-test za dva velika odvisna vzorca. Lahko zaključimo, da pri oceni koordinacije obstajajo statistično značilne razlike v vseh treh spremenljivkah. S tem smo potrdili hipotezo, da so pričakovane pozitivne kvantitativne spremembe koordinacije vplivale na predlagani model treninga v obdobju priprav petnajstletnih nogometašev. Avtorje je vodilo dejstvo, da je tovrsten program treningov v obdobju priprav zelo učinkovit za izboljšanje ravni koordinacije pri petnajstletnikih. Pridobljeni rezultati se lahko s pridom uporabijo v inovativnih načrtih in programih za obdobje priprav ter za namen prilagoditve potreb te populacije.

Ključne besede: nogomet, učinki v obdobju priprav, koordinacija

INTRODUCTION

Football is a sport that is characterized by numerous and varied complex dynamic kinesiology activities that are characterized by a large number of cyclic and acyclic movements (Gardasevic and Bjelica, 2013; Gardasevic, Bjelica and Vasiljevic, 2017). Soccer consists of various types of movements and actions like tackling, jumping, sprinting and kicking (Reilly, Williams, Nevill and Franks, 2000; Amiri-Khorasani, Osman and Yusof, 2009; Rađa, Erceg and Grgantov, 2016). The high specificity of loading, decision making under pressure of opponents (Hulka and Weisser, 2017) in all four moments of play, possession of the ball, the opponent's possession of it, the transformation after winning the ball and the transformation after losing the ball depends on the ability of players to perform certain movements of varying intensity, in different directions and the different sections of the field (Gardasevic and Bjelica, 2014). They must have developed basic and specific motor abilities (Gardasevic, Bjelica and Popović, 2015; Gardasevic, Bjelica, Milasinovic and Vasiljevic, 2016b). One of the basic motor skills, which should be at a high level, is a coordination.

Coordination is considered as the basic ability of the football player. Some authors identify it with agility. A football player with good coordination is the one who is able to perform complex situational-motor actions coordinated in a certain space and in time period as short as possible (Gardasevic, 2010). The coefficient of innate coordination is about 80%, the transformation of this motor abilities is quite limited.

The main objective of this study was to determine the level of quantitative changes of coordination in football cadet level, under the influence of a programmed football training which included one preparatory period of forty-two days.

MATERIALS AND METHODS

Subjects and procedures

This was a longitudinal study with an aim that in the two time-varying points determine quantitative changes of coordination in football cadet level (15 year $\pm$ 6 months) under the influence of programmed training process, which included a summer preparation period for the competition season in a unique cadet league of Montenegro and the cadet league middle region of Montenegro. The training program lasted 42 days and was carried out on the auxiliary football field of FC Sutjeska Niksic. The training program included 44 trainer units, within which 8 friendly matches were played.

For data processing only the results of those respondents who have undergone a complete program of work and who have joined the initial and final measurement are taken. This study included a sample of 120 young cadet football players of 4 teams, all from Niksic. Parents of all participants signed a consent form, which was in accordance with the Helsinki Declaration. Before programmed work all respondents had passed medical check-ups to make sure they could access the training process. When selecting the instruments (tests) it was taken into account that they meet the basic metric characteristics, which means the appropriate age and objective material and spatial conditions. For the assessment of coordination, the following tests were used: 1. Eight with bending (BMEWB); 2. Steps aside (BMSAS); 3. Legs slalom off with two balls (BMSTB).

The preparation period

Considering that these are cadet age players (15-year olds $\pm$ 6 months), in a sensitive period of psychophysical development, program is tailored specifically to their age, taking into account the time spent in the previous training process. Time structure of the training ranged from 60 to 120 minutes, depending on the goals and objectives of the training unit and it was divided into 3 phases:

- Introductory-preparatory part (25-30% of the duration of training)
- The main part (60-65% of the duration of the training)
- The final part (up to 10% of the duration of training)

In the introductory-preparatory part of the training the emphasis was on raising the operating temperature in children. As a tool, various elementary games with a ball were used that enabled work on the elementary basics of technique and tactics, also the various polygons with exercises coordination were used. A variety of games and exercises to increase joint mobility and strengthen muscles also applied at this stage.

At the first stage of the main part of the training the intensity is slightly increased compared to the warm-up phase and the training program was implemented through a variety of ball games. With a game method, the respondents were taught and practiced football skills through a large number of repetitions. At the second stage of the main part of the training the players mostly had a free game on two goals that allowed them creative activities and highlight of individual, imagination, independent thinking and hard work, applying the elements that teach by the method of the game from the first stage of the main part, and thus strengthening the willing quality. At this stage of the training the intensity was the greatest. At the final part of the training the task was lowering the physiological curve to an optimum level, and low-intensity activities were used: stretching and relaxation exercises, competitive game of penalty kicks, free kicks.

Statistical Analyses

Data obtained from the survey were analysed using descriptive and comparative statistics. In the area of descriptive statistics for each variable both in the initial and the final state central and dispersion parameters were processed as well as measures of asymmetry and flatness. The hypothesis of normal distribution of results was tested on the basis of Kolmogorov and Smirnov test. In the area of comparative statistics, to determine differences in the variables used to estimate the coordination at the start (initial state) and at the end (final state) of the training program in the preparation period, we used the discriminative parametric procedure Student's t-test for large dependent samples.

RESULTS AND DISCUSSION

In Tables 1 and 2 are shown the basic descriptive statistical parameters of variables for estimations of the coordination in the initial and final measurement, where the values of central and dispersion tendency were calculated: arithmetic mean (Mean), standard deviation (Std. Dev.), standard error of arithmetic mean (Std. Error), the coefficient of variation (CV%), minimum (Minimum) and maximum (Maximum) values, the range of results (Range), the curvature coef-

ficient (Skewness) and elongation (Kurtosis), as well as the values of Kolmogorov and Smirnov test (K-S test).

First the central and dispersive parameters of variables for assessing coordination in the initial state were analysed (Table 1).

Table 1. Central and dispersive parameters of variables for assessing coordination in the initial state

No.	Variables	Mean	Std. Dev.	Std. Error	CV%	Minimum	Maximum	Range	Skew-ness	Kurto-sis	K-S test
1.	BMEWB	17.44	0.64	0.06	3.66	15.66	19.01	3.35	-0.21	1.16	0.25
2.	BMSAS	9.15	0.49	0.04	5.37	8.22	10.35	2.13	0.30	-0.41	0.49
3.	BMSTB	25.97	2.29	0.21	8.82	21.45	32	10.55	0.29	0.05	0.63

By analysing the central and dispersion parameters of variables for assessing the coordination in the initial state-values of Kolmogorov and Smirnov test shows that the results are normally distributed. By the value of the coefficient of variation all the results belong to extremely homogeneous sets. There is a slightly higher range of results for a variable Legs slalom off with two balls (BMSTB), although this is expected given that the players meet for the first time with this test and it is not easy to control two balls at the same time. So, the scattering of the results is a bit higher but not statistically significant. Positive values of skewness in variables Steps aside (BMSAS) and Legs slalom off with two balls (BMSTB) show the inclination of the result to the better, because in the variable where the time is measured positive skewness says that the results are tilted to the side of the better. The value of the kurtosis in the variable Eight with bending (BMEWB) shows a greater sharpness of the curve, but within the limits of normal elongation.

Central and dispersive parameters of variables for estimation of the coordination in the final measurement showed the following values (Table 2).

Table 2. Central and dispersive parameters of variables for estimation of the coordination in the final measurement

No.	Variables	Mean	Std. Dev.	Std. Error	CV%	Minimum	Maximum	Range	Skew-ness	Kurto-sis	K-S test
1.	BMEWB	17.11	0.65	0.06	3.81	15.32	18.78	3.46	-0.25	1.13	0.23
2.	BMSAS	8.76	0.50	0.05	5.68	7.65	9.89	2.24	0.13	-0.46	0.82
3.	BMSTB	25.21	2.74	0.25	10.87	13.59	34.66	21.07	-0.58	3.73	0.24

By analysing the central and dispersive parameters of variables for estimation of the coordination in the final stage-it may be noted that the values of arithmetic means are in all three variables at a higher level than in the initial state. The coefficients of variation in all three variables indicate that the results belong to extremely homogeneous sets, the deviation to the individual results of the arithmetic mean is not large. There is still a slightly higher range of results for the variable Legs slalom off with two balls (BMSTB), although this is expected given that in the training program players did not have two-ball exercises at the same time. The value of the kurtosis in the variable Legs slalom off with two balls (BMSTB) shows that the results from the leptokurtic curve, statistically significantly sharper than normal curvature. The values of Kolmogorov and Smirnov test shows that the results are normally distributed in all three variables.

To determine the statistical significance (significance) of differences in arithmetic means (partial quantitative changes) of variables for estimation of the coordination, the t-test was applied to for large dependent samples. The values of t-test were on the level of significance (Sig.) from 0.01 ($p \leq 0.01$) in all the variables for the evaluation of coordination. The differences of arithmetic means of the initial and the final measurement of variables for evaluating coordination are shown in Table 3.

Table 3. The values of t-test between the arithmetic means of the initial and the final measurement of variables for evaluating coordination

	Variables	Mean	Std. Deviation	Std. Error	Correlation	t-test	Sig.
Par 1	BMEWBI	17.44	0.64	0.06	0.97	21.72	0.00
	BMEWBF	17.11	0.65	0.06			
Par 2	BMSASI	9.15	0.49	0.04	0.98	40.40	0.00
	BMSASF	8.76	0.50	0.05			
Par 3	BMSTBI	25.97	2.29	0.21	0.77	4.70	0.00
	BMSTBF	25.21	2.74	0.25			

Based on the results gained, it can be noted that there are statistically significant differences in all variables for estimation of the coordination, and therefore can be said that there was statistically significant positive partial effects of the training program in the preparation period, and the t-test values were significant at the reliability level $p < .01$ for all variables for estimation of the coordination. Greater improvement can be noticed in the coordination assessment test Steps aside (BMSAS). It is a test that contains such movements that is very close to a large number of movements on the football field, so it does not surprise such an improvement, despite a very high genetic determination of this motoric ability.

CONCLUSIONS

The aim of this study was to, based on the training work program of forty-two (42) days, determine the level of transformation of the coordination with cadet football players, under the influence of a scheduled football training that included one preparatory period. This study included a sample of 120 young cadet football players of 4 teams, all from Niksic, competing in a unique Montenegrin cadet league and in the middle region league of Montenegro. On the basis of the obtained parameters it can be concluded that the statistically significant partial quantitative effects (changes) in all the variables for estimation of the coordination obtained as a result of the training program applied in the preparation period. The method of work that has been applied in this training program abounds with exercises dominated by powerful explosive movements in various directions, players are often found in unexpected situations, so that the positive transformations are not unexpected (Gardašević, Bjelica and Vasiljević, 2016a).

Based on the results of t-test for large dependent samples, with the variables for estimation of the coordination the statistically significant differences were determined in all pairs of variables between the initial and final states, at the level of statistical significance (significance), $p < 0.01$. It can be concluded that the training program of work in preparation period has led to the positive transformation in all variables that were estimating, by the structure of a hypothetical setting of the models, the coordination. In this research, the authors were guided by the fact that such

a training program of work in preparation period is a very efficient way of working in terms of raising the level of coordination with cadet football players. The authors conclude that the summer period of 42 days, at cadet football players, with such training work program, is optimal for lifting the coordination to the level required for the competition. The gained results can be directed towards innovation of plans and programs of work in the preparation period, and adjusting the same to the needs of the talented players, because European top-level soccer clubs are continually looking for the most talented players (Sæther, 2016).

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CONFLICTS OF INTEREST

All authors confirm - no potential conflict of interest exists for this study.

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