

STUDY ON THE IMPROVEMENT OF PHYSICAL TRAINING A OF THE UNDER 17 FOOTBALL PLAYERS ACTING ON THE SIDE AREA

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Abstract

The purpose of this research is to improve the physical preparation of the Under 17 juniors of the LPS Galați football team, who activate on the side area of the field, by using the side-area specific games in the preparation of players. The two groups involved in the experiment are LPS Galați and Supporter Club Otelul Galați, teams registered in the National Republican Junior Championship. The experimental research took place on the Siderurgistul Stadium in Galați, pitch with standard dimensions and with a synthetic surface, which did not influence the training program. The experimental program included three training sessions per week, during July - December 2022. For the assessment of the subjects we applied the following tests, approved by the Romanian Football Federation: speed (agility) – shuttle run 4x10 meters; Endurance -running 12 minutes; Strength - jump. The statistical analysis was carried out with the help of the IBM SPSS Statistics program, version 23. The results confirmed the viability of the training program, recording statistically significant differences ($p < 0.05$) in favor of the experimental group, compared to the control group.

Introduction

The rule of using the under juniors in the professional football leagues is beneficial for the Romanian football, but at the same time it urges clubs and high schools to form players capable of evolving at this level (Mallo J., Navarro E., 2008); Savu C.V., Cazan F., 2021). A study conducted by the Romanian Football Federation found that most clubs use junior players on the side areas of the field, that is lateral or extreme midfielders, depending on the approached game system (www.frf.ro).

For this reason, coaches, performance experts and involved in physical training and not only, constantly investigate modern methods or ways of training aiming at maximizing performance (Stanculescu V., 1999; Terzis A., 2013). Maximizing performance is determined by a large number of football-related factors, the requirements and effects imposed on junior players through different training scenarios, being conditioned by the needs of juniors during matches.

(Owen et al., 2016). Regardless of the game system used, it is necessary to know the profile of the players that evolve on the side area of the field and it must have a series of football features. Therefore, it is understandable that as a player the four moments of the game (Davies JC., 2013).

Thus, we can draw the conclusion, if the content of the preparation is wrongly planned or managed, through an inadequate methodological approach, the physical performance is modest, with insufficiently prepared players (Grosu B.M., 2020, Melenco I.,2007). The people in charge of preparing the junior football players understand the importance of physical training, specific to high intensity football, the maximization of this profile being fundamental to obtain progress in the development of these Under 17 juniors (Mazzantini M.,Bombardieri S.,2011).

Material- Method

Purpose, aims and hypothesis of the research

The purpose of this research is to improve the physical preparation of the Under 17 juniors from the LPS Galați football team, who act on the side area of the field, by using area-specific games in the preparation.

The aim of the research was to carry out an experiment-like study aimed at developing a training program to improve the physical training of Under 17 junior players who evolve on the side areas of the field.

The research hypothesis: In this research we proposed the hypothesis that "the use of a training program based on the area-specific games method will lead to improvement in the physical training of the Under 17 juniors in football".

Subjects, Location and Stages of the Research

The two groups involved in the experiment are the Under 17 juniors of the LPS Galați and Supporter Club Otelul Galați teams, juniors that play on the side areas of the field, 16 players, 8 from each team. The experimental research took place on the Siderurgistul Stadium in Galați, with a standard pitch and a synthetic surface. The research included the following stages: stage 1- carrying out the initial evaluation; Stage 2- Applying the training program based on the area-specific training method; Stage 3- carrying out the final evaluation; Stage 4- Interpretation of results and conclusions.

The following *research methods* were used: analysis of specialized literature, observation, experiment, measurement and testing method, statistical and mathematical method, graphical and tabular representation (G.Gheorghiu, 2014; Mocanu G.D., 2015). For the statistical analysis we used IBM SPSS Statistics, version 23. The T test for two pair samples is used to test if the difference between the averages of the two groups considered is statistically significant. The correlation coefficient Pearson (r) indicates whether or not there is a dependence

relation between two phenomena, as well as the degree of correlation. The meaning threshold considered for the statistical tests is $\alpha = 0.05$.

In order to *apply the experimental program* we have designed and applied a training program based on the specific games method.

Example:

1. Run from the 6 m line to the touchline of the field.
2. Simulate deposal by sliding.
3. Simulate passing the ball to the wing left or right side.
4. Maximum speed run, cross the halfway line to receive the ball on a wing side position.
5. In a wing side position, take over, crossing and finishing.
6. Maximum speed run in defense, taking up position in the defense squad.

The experimental training program was designed during 5 months, August-December 2022, with three 90-minute training sessions per week. The control group worked according to its own training program which consisted in improving the physical training by the global training method.

Subject assessment

We used the following tests for the assessment of subjects. They are approved by the Technical Committee of the Romanian Football Federation (www.frf.ro):

1. speed (agility) – shuttle run 4x10 meters;
2. endurance -run 12 minute;
3. strength - jump.

Results

For the statistical analysis we used IBM SPSS Statistics, version 23. The Levene test checks the equality of variances of two independent groups and it is used to interpret the t test for independent samples. The t test for independent samples is used to test whether the difference between the mean values of two groups made of different subjects is statistically significant. The t test for two paired samples is used to compare the mean values of a variable for a single group, analyzed at different times. Pearson's correlation coefficient (r) shows whether or not there is any dependence between two phenomena as well as their degree of correlation. The significance threshold considered for the statistical tests is $\alpha = 0.05$.

1. Speed (agility) – shuttle run 4x10 meters

Expressing results in seconds, we find that for the control group, initially, the speed-agility on 4 x 10 meters varied between 1.80'' and 11.4'', with a mean of

11.1’’ (standard deviation 0.25’’), and for the experimental group, initially, speed-agility on 4 x 10 meters varied between 10.9’’ and 11.7’’, with a mean of 11.25’’ (standard deviation 0.36’’).

In the final testing, the speed-agility on a 4 x 10 meter distance varied between 10.5’’ and 10.9’’, with a mean of 10.7’’ (standard deviation 0.18’’), which is a progress compared to the initial testing of 2.88%. As to the experimental group in the final testing, the speed on 4 x 10 m varied between 10’’ and 10.5’’, with a mean of 10.27’’ (standard deviation 0.26’’), value which represents a progress of 4.66%.

After the t test was performed, in order to identify the difference between the mean values of two paired samples, when comparing the values of the control group in the initial testing and in the final testing, we found the value $t = 14.14$, which, compared to the number of cases in Fisher’s table for the $p < 0.001$ significance threshold, thus demonstrating there are significant differences between the recorded time in the initial and the final testing for the control group. The t test shows significant statistical differences between the values of the initial testing and those of the final testing of the experimental group ($t = 15.60$, $p < 0.001$).

The Pearson correlation test shows a strong positive correlation between the values of the experimental group in the initial testing for speed-agility and the results of the same group in the final testing ($r = 0.652$, $p = 0.0035 < 0.05$).

Table 1. PAIRED SAMPLES TEST

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Speed-Agility 4x10 m, initial testing, control group – Speed-Agility 4x10 m, final testing, control group	0.12448	0.04512	0.01123	0.08879	0.14021	11.259	7	0.000
Pair 2	Speed - Agility 4x10 m, initial testing, exp. group – Speed-Agility 4x10 m, final testing, exp.group	0.19634	0.03066	0.00692	0.17097	0.20144	25.115	7	0.000

The t test for independent sample was used to analyze the results of the control group compared to the experimental group in the initial and final testing.

For the speed-agility 4x10 m initial testing, the Levene test confirms the equality of variances for the two groups: $F = 0.881$ and $p = 0.362 > \alpha = 0.05$. Hence, the result of the t test is to be read on the first row of the table (equal variances assumed). As $t = 1.137$ and Sig.(2-tailed) or $p = 0.271 > \alpha = 0.05$ or

taking into account that the confidence limits for the difference between the means of the two groups (95% CI for the mean difference: (-0.01202, 0.04231)) includes the zero value it implies there are no significant differences between the average time of the two groups.

As to the final testing for speed-agility 4x10 m, the Levene test also proves the equality of variances for the two groups: $F = 1.475$ and $p = 0.244 > \alpha = 0.05$. As $t = 6.4131$, $p < 0.001$, the confidence limits for the difference between the means of the two groups (0.06112, 0.11334) do not include the zero value, it results that there are significant differences of the time recorded for the final testing in speed-agility 4x10 between the control and the experimental group. The lesser average value of the experimental group in the final testing proves that the training program was efficient.

Table 2. INDEPENDENT SAMPLES TEST

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
SPEED AGILITY 4X10m, initial testing	Equal variances assumed	0.881	0.362	1.137	14	0.271	0.0150	0.01319	-0.0120	0.0423
	Equal variances not assumed			1.137	13.81	0.271	0.0150	0.01319	-0.0120	0.0423
SPEED AGILITY 4X10m, final testing	Equal variances assumed	1.475	0.244	6.413	14	0.000	0.0855	0.01337	0.0611	0.1133
	Equal variances not assumed			6.413	13.26	0.000	0.0855	0.01337	0.0611	0.1134

2. Endurance – 12 minute run

Expressing results in meters, we find that for the control group, the endurance (12 min.) varied initially between 2420 and 2510, with a mean of 2457.14 (standard deviation 28.12), and for the experimental group the endurance (12 min.) initially varied between 2420 and 2540, with a mean of 2480 (standard deviation 38.30).

In the final testing the endurance (12 min.) varied between 2560 and 2620, with a mean of 2587.14 (standard deviation 22.15), which is a progress compared

to the initial testing of 4.15%. As to the experimental group, the endurance in the final testing (12 min.) varied between 2600 and 2700, with a mean of 2650 (standard deviation 32.66), which represents a progress compared to the initial testing of 10.18%.

The t test, used to assess the difference between paired samples shows significant statistical differences between the initial and the final testing in the case of endurance test (12 min.) for the control group ($t = -12.434$, $p < 0.001$), but for the experimental group, too ($t = -13.884$, $p < 0.00100$).

We have found highly significant correlations ($p < 0.001$) between the values of the initial testing and those of the final testing for the control group ($r = 0.968$), the initial testing and final testing for the experimental group ($r = 0.998$), the experimental and the control group in the initial testing ($r = 0.981$), the experimental and the control group in the final testing ($r = 0.967$).

Table 3. PAIRED SAMPLES TEST

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	ENDURANCE TEST - 12 minute run, initial testing, control group - final testing, control group	-130.226	16.335	3.616	-180.355	-70.224	-21.055	7	0.000
Pair 2	ENDURANCE TEST - 12 minute run, initial testing, experimental group - final testing, experimental group	-170.328	20.010	8.488	-195.662	-144,333	-22.875	7	0.000

In the case of the initial testing for endurance- 12 minute run, the Levene test confirms the equality of variances for the two groups: $F = 0.767$ and $p = 0.422 > \alpha = 0.05$. Consequently, the result of the t test is to be read on the first row of the table (equal variances assumed). As $t = 0.076$ and $\text{Sig.}(2\text{-tailed})$ or $p = 0.939 > \alpha = 0.05$ or considering the fact that the confidence limits for the difference between the means of the two groups (95% CI for the mean difference: (-227.27, 245.05)) includes the zero value it results there are no significant differences between the average time of the two groups.

In the case of the final testing for speed-agility 4x10 m, the Levene test also shows the equality of variances for the two groups: $F = 1.686$ and $p = 0.233 > \alpha = 0.05$. Because $t = 4.21$, $p < 0.001$, the confidence limits for the difference between the means of the two groups do not include the zero value, it results that there are significant differences between the time of the final testing in endurance-12 minute run between the control and the experimental group. The greater mean of the experimental group in the final testing proves the efficiency of the training program

Table 4. INDEPENDENT SAMPLES TEST

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
ENDURANCE TEST - 12 minute run, Initial testing	Equal variances assumed	0.767	0.422	0.076	14	0.939	22,86	116.209	-	245.05
	Equal variances not assumed			0.076	13.888	0.939	22,44	116.209	-	245.05
ENDURANCE TEST - 12 minute run, final testing	Equal variances assumed	1.686	0.233	4.21	14	0.560	62.86	117.045	-	168.97
	Equal variances not assumed			4.18	13.888	0.560	60.05	117.045	-	168.97

3. Strength – jump

In the case of the strength-jump test the value of the initial testing for the control group was situated between 38 and 47, with a mean of 42 (standard deviation 2.89), and for the experimental group the values varied between 38 and 46, with a mean of 42 (standard deviation 3.27).

After the final testing the recorded values for the control group were situated between 49 and 56 cm, with a mean of 51.57cm. (standard deviation 2.76), which shows a progress of 6.46% compared to the initial testing. The experimental group achieved values between 51 and 57 cm at the final testing, with a mean of 54.57 cm. (standard deviation 2.30), which represents a progress of 12.05% compared to the initial testing.

After the application of the t test in the case of strength-jump it resulted there were statistically significant differences between the initial and final testing for the control group ($t = -17.120$, $p < 0.001$). We reached the same conclusion for the experimental group ($t = -28.211$, $p < 0.001$).

In the case of the strength-jump test highly significant correlations were found ($p < 0.05$) between the initial and final testin for the control group ($r = 0.586$, $p = 0.007$), the initial and final testing for the experimental group ($r = 0.884$, $p <$

0.001), the experimental group and the control group in the initial testing ($r = 0.466$, $p = 0.044$), the experimental group and the control group in the final testing ($r = 0.668$, $p = 0.002$).

Table 5. PAIRED SAMPLES TEST

		Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Pair 1	STRENGTH-JUMP, initial testing, control group – final testing, control group	-5.29	1.70	0.00767	-0.15435	-0.10988	-8,205	7	0.000
Pair 2	STRENGTH-JUMP, initial testing, experimental group – final testing, experimental group	-6.57	2.07	0.00776	-0.23228	-0.20104	-8,398	7	0.000

On analyzing the results of the strength-jump test, we found the equality of variances for the two groups in the initial testing ($F = 0.922$, $p = 0.325 > \alpha = 0.05$). The t test for independent samples proves there are no significant differences between the means of the two groups ($t = -0.610$, $p = 0.480 > \alpha = 0.05$).

For the final testing of the strength-jump test we found that the variances of the groups were not equal ($F = 12.444$, $p = 0.047 < 0.05$). The t test confirmed the difference of the mean between the two groups on this test ($t = -2.210$, $p < 0.001$). The greater values for the experimental group proved the efficiency of the programs applied to this group.

Table 6. INDEPENDENT SAMPLES TEST

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
STRENGTH-JUMP, initial testing	Equal variances assumed	0.922	0.43	1.025	14	0.914	1.71	0.01610	-0.029	0.032
	Equal variances not assumed			1.025	12.515	0.914	1.71	0.01610	-0.029	0.032
STRENGTH-JUMP, final testing	Equal variances assumed	12.44	0.03	2.210	14	0.000	3	0.01690	-0.116	-0.048
	Equal variances not assumed			2.210	12.188	0.000	3	0.01690	-0.117	-0.048

Discussions

The use of the area-specific training method allowed an improvement of the physical training of the Under 17 players acting in the side areas of the field within a limited time.

During the specific-area training the manipulation of the variables (i.e. the size of the field; the number of repetitions; the duration of the rest period) has a direct influence on the physical preparation. If the size of the working surface is greater the physical activity increases in favor of endurance, if the size of the working surface is smaller the physical activity increases in favor of improving agility and jump.

Conclusions

The research carried out allows us to draw several conclusions regarding the efficiency of our own training program, based on the area-specific training method.

Considering the recorded results, higher performances of the Under 17 junior players of the experimental group can be seen compared to the players of the control group ($p < 0.05$). Thus, we can state that the repeated practice for five months has improved the level of physical training, which allowed the athletes to move movements with a higher speed, strength and agility, fact which was also underlined by the highlighted positive correlations.

The ability to develop, within a relatively short period of time the physical training, makes the area-specific training method an attractive proposal for the Under 17 junior players as well as for coaches.

In conclusion, the research highlights the fact that the hypothesis according to which “the application of a training program based on the area-specific games

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method will lead to the improvement of the physical training of the Under 17
juniors has been confirmed.

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