STATISTICAL APPROACHES CONCERNING THE PHYSICAL AND TECHNICAL TRAINING IN FOOTBALL

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Abstract
This research reflects a physical and technical model of training, so that at the end of the experiment, the F.C.M. Dunarea Galati footballers can reach the actual values depending on the driving skills of the subjects. The purpose of this research is to elaborate the physical and technical training model of the players with F.C.M. Dunarea Galati. The F.C.M. Dunarea Galati team is made up of eleven 16-17 years old players, and the methods of the research used are: the statistical and tabular methods. Because the results of the research were positive and the progress between the initial and the final tests were visible, the statistical analysis reflected the effectiveness of the physical-technical training of the team players. The physical-technical training of the F.C.M. Dunarea Galati fooftball team is well-balanced and correctly conceived.
Key words: *physical factor, technical factor, trend, regression, forecast.*

INTRODUCTION

The pattern of selection, training and playing will pursue the achievement of the objectives and reference framework, in order to:

- achieve a level of competitive training in relation to age, with morphofunctional, physical and mental peculiarities;
- carry out a practical and theoretical-methodological training necessary for the integration in the sporting activity of performance and social life;
- educate discipline, the will to obtain victory, to overcome the difficulties that arise in the game owing to fatigue, the enemy, the terrain or to the weather conditions.

The state of the art in this domain is represented by the essential research belonging to V. Cojocaru who elaborated a strategy for the preparation of young footballers [1].

AIM

The aim of the research consists in establishing a physical and technical model of training for competitions for the F.C.M. Dunarea Galati football team players.

HYPOTHESIS

The starting hypothesis is that the elaboration of a physical and technical training model for the footballers of F.C.M. Dunarea Galati will effect in final tests results superior to the values of the initial tests.

MATERIAL AND METHODS

The experiment was carried out between 2012 and 2013 at F.C.M. Dunarea Galati and included 16-17 year old footballers. The research methods used are: scientific documentation, the statistical method and the observation method.

The sample investigated is described in Table 1.

Table 1. The F.C.M. Dunarea Galati team players

No.	Name and surname	The birthday	The post in team
1	C.S.	12.04.1996	goalkeeper
2	B.E	25.08.1996	goalkeeper
3	C.B	19.12.1996	midfielder
4	S.A.	21.05.1996	midfielder
5	C.I.	15.04.1996	midfielder
6	A.B.	27.05.1996	midfielder
7	T.A.	19.03.1996	midfielder
8	P.R..	07.02.1996	striker
9	P.C.	01.07.1996	striker
10	R.A.	22.11.1996	quarterback
11	S.B.	11.06.1996	quarterback
12	V.F.	26.04.1996	quarterback

In this research, we proposed the following tests concerning the driving level: 50m dash, squat jump, 1000m run, passing in three, shot at the goalpost from midfield, 6 x 6 bilateral game.

The tests were assessed in seconds, minutes, centimeters and meters. The tests were applied in three stages: the initial one in October 2012, the intermediate one in December 2012 and the final test in May 2013.

RESULTS OF THE RESEARCH

TESTS AT DRIVING LEVEL

Table 2. Initial tests for F.C.M. Dunarea Galati football team

No.	Name and surname	Position	50m dash	Squat jump	1000 m run	Passing in three	Shot at the goalpost from midfield	6 x 6 bilateral game
1.	B.E	goalkeeper	7.8	1.76	4.35	2	4	6
2.	C.B	goalkeeper	7.7	1.90	4.25	3	7	7
3.	S.A.	midfielder	7.0	2.10	4.15	4	8	8
4.	C.I.	midfielder	7.6	1.85	4.35	3	6	7
5.	A.B.	midfielder	7.9	1.80	4.25	4	7	8
6.	T.A.	midfielder	7.3	2.20	4.05	4	7	7
7.	P.R..	midfielder	7.6	2.10	4.20	5	8	7
8.	P.C.	striker	7.8	2.00	4.25	4	8	8
9.	R.A.	striker	7.3	2.10	4.30	3	7	6
10.	S.B.	quarterback	7.5	2.30	4.20	3	6	7
11.	V.F.	quarterback	6.9	2.25	4.10	4	7	8
$\bar{x}$			**7.49**	**2.03**	**4.22**	**3,54**	**6.81**	**7.18**

Table 3. Intermediates tests for F.C.M. Dunarea Galati football team

No.	Name and surname	Position	50m dash	Squat jump	1000 m run	Passing in three	Shot at the goalpost from midfield	6 x 6 bilateral game
1.	B.E	goalkeeper	7.6	1.80	4.30	3	6	8
2.	C.B	goalkeeper	7.4	1.95	4.25	4	7	7
3.	S.A.	midfielder	6.9	2.12	4.15	5	8	9
4.	C.I.	midfielder	7.3	1.90	4.30	4	7	8
5.	A.B.	midfielder	7.5	1.84	4.20	5	8	9
6.	T.A.	midfielder	7.1	2.24	3.70	4	8	8
7.	P.R..	midfielder	7.4	2.12	4.15	5	9	8
8.	P.C.	striker	7.4	2.02	4.15	4	8	8
9.	R.A.	striker	7.1	2.12	4.25	3	7	9
10.	S.B.	quarterback	7.3	2.35	4.15	4	9	9
11.	V.F.	quarterback	6.8	2.35	3.75	5	8	9
$\bar{x}$			**7.25**	**2.07**	**4.12**	**4.18**	**7.72**	**8.36**

Table 4. Final tests for F.C.M. Dunarea Galati football team

No.	Name and surname	Position	50m dash	Squat jump	1000 m run	Passing in three	Shot at the goalpost from midfield	6 x 6 bilateral game
1.	B.E	goalkeeper	7.2	1.85	4.25	4	8	9
2.	C.B	goalkeeper	7.1	2.05	4.20	4	8	8
3.	S.A.	midfielder	6.7	2.15	4.10	5	10	10
4.	C.I.	midfielder	7.0	2.00	4.25	5	8	9
5.	A.B.	midfielder	7.2	1.90	4.10	5	9	10
6.	T.A.	midfielder	6.9	2.30	3.50	4	10	10
7.	P.R..	midfielder	6.9	2.15	4.10	5	10	10
8.	P.C.	striker	7.0	2.05	4.05	4	10	10
9.	R.A.	striker	6.8	2.15	4.15	4	8	9
10.	S.B.	quarterback	6.9	2.45	4.10	5	10	10
11.	V.F.	quarterback	6.7	2.40	3.55	5	9	10
$\bar{x}$			**6.94**	**2.13**	**4.03**	**4.54**	**9.09**	**9.54**

If we analyse Tables 2-4¸ we observe that:

1) 50m dash: the initial average is 7.49 sec.; the intermediate average is 7.25 sec.; the final average is 6.94 sec. The progress between the initial and the final average is 0.55 sec.

2) squat jump: the initial average is 203 cm; the intermediate average is 207 cm; the final average is 213 cm. The progress between the initial and the final average is 10 cm.

3) 1000m run: the initial average is 4'22"; the intermediate average is 4'12"; the final average is 4'03". The progress between the initial and the final average is 19".

4) passing in three: the initial average is 3.54; the intermediate average is 4.18; the final average is 4.54. The progress between the initial and the final average is 1.

5*) shot at the goalpost from midfield:* the initial average is 6.81; the intermediate average is 7.72;

the final average is 9.09. The progress between the initial and the final average is 2.28.

6) 6x6 bilateral game: the initial average is 7.18; the intermediate average is 8.36; the final average is 9.54. The progress between the initial and the final average is 2.36.

For making a forecast concerning the averages of the driving levels, we must establish the type of function reflected by the values. In this sense, we applied the method of the coefficients to study the variation, the real method of selection for the best model of tendency and we consider the year from the middle of the series for each factor, as origin of calculation, while through the achievement of the substitution $\sum_{i=-m}^{m} t_i = 0$.

● In the case of the factor *X=the average for the 50 m dash*:

- if we formulate the null hypothesis H_0*:* that assumes the existence for the model of the tendency of the factor *X* right the function $x_{t_i} = a + b \cdot t_i$, then the parametres *a* and *b* of the adjusted function of the first degree can be calculated by means of the linear regression:

$$S = \sum_{i=1}^{n} (x_i - x_{ti})^2 = \min \Leftrightarrow S = \sum_{i=1}^{n} (x_i - a - bt_i)^2 = \min$$

$$\begin{cases} \dfrac{\partial S}{\partial a} = 0 \\ \dfrac{\partial S}{\partial b} = 0 \end{cases} \Rightarrow \begin{cases} 2\sum\limits_{1=1}^{n} (x_i - a - bt_i)(-1) = 0 /(-\dfrac{1}{2}) \\ 2\sum\limits_{1=1}^{n} (x_i - a - bt_i)(-t_i) = 0 /(-\dfrac{1}{2}) \end{cases} \Rightarrow \begin{cases} na + b\sum\limits_{i=1}^{n} t_i = \sum\limits_{i=1}^{n} x_i \\ a\sum\limits_{i=1}^{n} t_i + b\sum\limits_{i=1}^{n} t_i^{\,2} = \sum\limits_{i=1}^{n} x_i t_i \Rightarrow \\ \sum\limits_{i=1}^{n} t_i = 0 \end{cases}$$

$$a = \frac{\begin{vmatrix} \sum\limits_{i=1}^{n} x_i & \sum\limits_{i=1}^{n} t_i \\ \sum\limits_{i=1}^{n} x_i t_i & \sum\limits_{i=1}^{n} t_i^{\,2} \end{vmatrix}}{\begin{vmatrix} n & \sum\limits_{i=1}^{n} t_i \\ \sum\limits_{i=1}^{n} t_i & \sum\limits_{i=1}^{n} t_i^{\,2} \end{vmatrix}} = \frac{\begin{vmatrix} \sum\limits_{i=1}^{n} x_i & 0 \\ \sum\limits_{i=1}^{n} x_i t_i & \sum\limits_{i=1}^{n} t_i^{\,2} \end{vmatrix}}{\begin{vmatrix} n & 0 \\ 0 & \sum\limits_{i=1}^{n} t_i^{\,2} \end{vmatrix}} = \frac{\sum\limits_{i=1}^{n} x \sum\limits_{i=1}^{n} t_i^{\,2}}{n\sum\limits_{i=1}^{n} t_i^{\,2}} = \frac{\sum\limits_{i=1}^{n} x_i}{n} \quad b = \frac{\begin{vmatrix} n & \sum\limits_{-m}^{m} x_i \\ \sum\limits_{-m}^{m} t_i & \sum\limits_{-m}^{m} x_i t_i \end{vmatrix}}{\begin{vmatrix} n & \sum\limits_{-m}^{m} t_i \\ \sum\limits_{-m}^{m} t_i & \sum\limits_{-m}^{m} t_i^{\,2} \end{vmatrix}} = \frac{\begin{vmatrix} n & \sum\limits_{-m}^{m} x_i \\ 0 & \sum\limits_{-m}^{m} x_i t_i \end{vmatrix}}{\begin{vmatrix} n & 0 \\ 0 & \sum\limits_{-m}^{m} t_i^{\,2} \end{vmatrix}} = \frac{n\sum\limits_{-m}^{m} x_i t_i}{n\sum\limits_{-m}^{m} t_i^{\,2}} = \frac{\sum\limits_{-m}^{m} x_i t_i}{\sum\limits_{-m}^{m} t_i^{\,2}}$$

Table 5. Estimates of the values for the variation coefficients in the case of the adjusted function of the first degree, in the hypothesis of the linear evolution of the factor *X= 50m dash*

Test	Average for 50 m dash (x_i)	LINEAR TREND				
		t_i	t_i^2	$t_i x_i$	$x_{t_i} = a + bt_i$	$\lvert x_i - x_{t_i} \rvert$
Initial	7.49	-1	1	-7.49	7.505	0.015
Intermediate	7.25	0	0	0	7.230	0.020
Final	6.94	1	1	6.94	6.955	0.015
Total		0	2	-0.55	21.690	0.050

If we calculate the statistical dates to adjust the linear function, for the parametres *a* and *b* we obtain the values:

$$a = \frac{21{,}68}{3} = 7{,}23 \qquad \text{and} \qquad b = \frac{-0{,}55}{3} = -0{,}275$$

Hence, the coeficient of variation for the adjusted function of the first degree is:

$$v_I = \left[\frac{\sum\limits_{i=-m}^{m} \left| x_i - x_{t_i}^I \right|}{n} : \frac{\sum\limits_{i=-m}^{m} x_i}{n} \right] \cdot 100 = \frac{\sum\limits_{i=-m}^{m} \left| x_i - x_{t_i}^I \right|}{\sum\limits_{i=-m}^{m} x_i} \cdot 100 = \frac{0{,}05}{21{,}68} \cdot 100 = 0{,}23\%$$

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in the situation of the alternative hypothesis H_1*:* that specifies the assumption of the existence for the model of the tendency of the factor *X* right the parabolical function $x_{t_i} = a + b \cdot t_i + ct_i^2$, the parametres *a*, *b* and *c* of the adjusted function of the second degree, can be calculated by means of the system:

$$\begin{cases} n\cdot a + c\sum_{i=-m}^{m} t_i^2 = \sum_{i=-m}^{m} x_i \\ b\cdot \sum_{i=-m}^{m} t_i^2 = \sum_{i=-m}^{m} t_i \cdot x_i \\ a\cdot \sum_{i=-m}^{m} t_i^2 + c\sum_{i=-m}^{m} t_i^4 = \sum_{i=-m}^{m} t_i^2 \cdot x_i \end{cases}$$

Consequently,

$$a = \frac{\sum_{i=-m}^{m} t_i^4 \cdot \sum_{i=-m}^{m} x_i - \sum_{i=-m}^{m} t_i^2 \cdot \sum_{i=-m}^{m} t_i^2 \cdot x_i}{n\cdot \sum_{i=-m}^{m} t_i^4 - (\sum_{i=-m}^{m} t_i^2)^2};$$

$$b = \frac{\sum_{i=-m}^{m} t_i \cdot x_i}{\sum_{i=-m}^{m} t_i^2}; \qquad c = \frac{n\cdot \sum_{i=-m}^{m} t_i^2 \cdot x_i - \sum_{i=-m}^{m} t_i^2 \cdot \sum_{i=-m}^{m} x_i}{n\cdot \sum_{i=-m}^{m} t_i^4 - (\sum_{i=-m}^{m} t_i^2)^2}$$

Table 6. Estimates of the values for the variation coefficients in the case of the adjusted function of the second degree, in the hypothesis concerning the parabolic evolution of the factor *X= 50m dash*

Test	**Average for 50 m dash (x_i)**	**PARABOLIC TREND**				
		t_i^2	t_i^4	$t_i^2 \cdot x_i$	$x_{t_i} = a + bt_i + ct_i^2$	$\lvert x_i - x_{t_i} \rvert$
Initial	7.49	1	1	7.49	11.115	3.625
Intermediate	7.25	0	0	0	0	0
Final	6.94	1	1	6.94	10.565	3.625
Total		2	2	21.68	21.680	7.250

In this way, if we calculate the statistical dates to adjust the second function, we obtain the next values for parametres *a, b* and *c*:

$$a = \frac{2\cdot 21{,}68 - 2\cdot 21{,}68}{3\cdot 2 - (2)^2} = 0;\ b = \frac{-0{,}55}{2} = -0{,}275;\ c = \frac{3\cdot 21{,}68 - 2\cdot 21{,}68}{3\cdot 2 - (2)^2} = 10{,}84$$

So, the coeficient of variation for the adjusted function of the second degree has the value:

$$v_{II} = \left[\frac{\sum_{i=-m}^{m} \left| x_i - x_{t_i}^{II} \right|}{n} : \frac{\sum_{i=-m}^{m} x_i}{n} \right] \cdot 100 = \frac{\sum_{i=-m}^{m} \left| x_i - x_{t_i}^{II} \right|}{\sum_{i=-m}^{m} x_i} \cdot 100 = \frac{7{,}25}{21{,}68} \cdot 100 = 33{,}44\%$$

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in the case of the alternative hypothesis H_2*:* that describes the assumption of the existence for the the model of the tendency of the factor *X* right the exponential function $x_{t_i} = ab^{t_i}$, then the parametres *a* and *b* of the adjusted exponential function can be calculated by means of the following system:

$$\begin{cases} n\cdot \lg a = \sum_{i=-m}^{m} \lg x_i \\ \lg b \cdot \sum_{i=-m}^{m} t_i^2 = \sum_{i=-m}^{m} t_i \cdot \lg x_i \end{cases} \Rightarrow \quad \lg a = \frac{\sum_{i=-m}^{m} \lg x_i}{n} \quad \text{and} \quad \lg b = \frac{\sum_{i=-m}^{m} t_i \cdot \lg x_i}{\sum_{i=-m}^{m} t_i^2}$$

Table 7. Estimates of the values for the variation coefficients in the case of the adjusted exponential function, in the hypothesis concerning the exponential evolution of the factor *X= 50m dash*

Test	Average for 50m dash (x_i)	EXPONENTIAL TREND					
		$\lg x_i$	t_i	$t_i \lg x_i$	$\lg x_{t_i} = \lg a + t_i \cdot \lg b$	$x_{t_i} = ab^{t_i}$	$\lvert x_i - x_{t_i} \rvert$
Initial	7.49	0,874481817	-1	-0.874481817	0.875287604	7.503909783	0.01
Intermediate	7.25	0.860338006	0	0	0.858726431	7.223146628	0.03
Final	6.94	0.84135947	1	0.84135947	0.842165258	6.95288839	0.10
Total		2.576179293		-0.033122347		21.6799448	0.14

Consequently, if we calculate the statistical data to adjust the exponential function, for the parametres *a* and *b* we obtain the values:

$$\lg a = \frac{2{,}576179293}{3} = 0{,}858726431$$

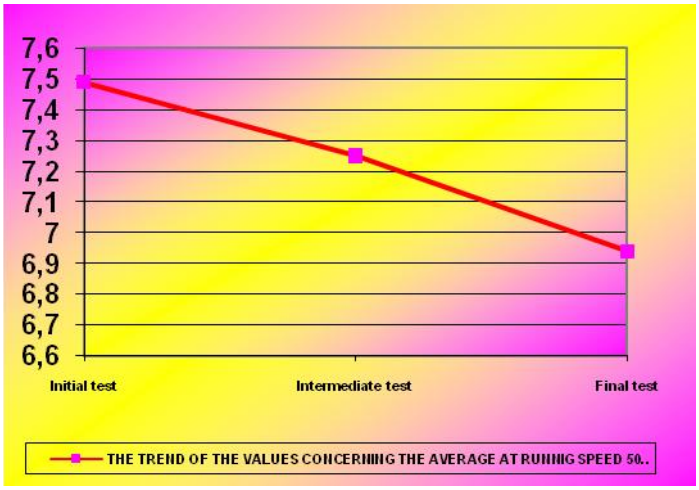
$$\lg b = \frac{-0{,}033122347}{2} = -0{,}016561173$$

Accordingly, the coeficient of variation for the adjusted exponential function has the following value:

$$v_{\exp} = \left[\frac{\sum_{i=-m}^{m} \left| x_i - x_{t_i}^{\exp} \right|}{n} : \frac{\sum_{i=-m}^{m} x_i}{n} \right] \cdot 100 = \frac{\sum_{i=-m}^{m} \left| x_i - x_{t_i}^{\exp} \right|}{\sum_{i=-m}^{m} x_i} \cdot 100 = \frac{0{,}14}{21{,}68} \cdot 100 = 0{,}64\%$$

We observe that: $v_I = 0{,}23\% < v_{\exp} = 0{,}64\% < v_{II} = 33{,}44\%$

Therefore, the road follows by the factor *X*, 50 m dash, is a linear model $x_{t_i} = a + b \cdot t_i$.



Type 1. Linear model of the average for 50 m speed running

If we forecast the level concerning *the 50 m speed running* in a period *t+1* after the final test, we obtain the value $x_{ti} = a + b \cdot 2 = 7{,}23 + (-0{,}275) \cdot 2 = 6{,}68$ seconds.

Table 8. Estimates of the values for the variation coefficients in the case of the adjusted function of the first degree, in the hypothesis concerning the linear evolution of the averages for the following tests

Tests	Phase of the test	Average $\bar{x}$	LINEAR TREND							
			t_i	t_i^2	$t_i x_i$	$x_{t_i} = a + bt_i$	$\lvert x_i - x_{t_i} \rvert$	$a = \frac{\sum_{i=1}^{n} x}{n}$	$b = \frac{\sum_{i=1}^{n} t_i x_i}{\sum_{i=1}^{n} t_i^2}$	v (%)
Squat jump	Initial	2.03	-1	1	-2.03	2.027	0.003	2.077	0.05	0.21
	Intermed	2.07	0	0	0	2.077	0.007			
	Final	2.13	1	1	2.13	2.127	0.003			
	Total	6.23	0	2	0.10	6.231	0.013			
1000 m run	Initial	4.22	-1	1	-4.22	4.218	0.002			

	Intermed	4.12	0	0	0	4.123	0.003	4.123	-0.095	0.06
	Final	4.03	1	1	4.03	4.028	0.002			
	Total	12.37	0	2	-0.19	12.369	0.007			
Passing in three	Initial	3.54	-1	1	-3.54	3.587	0.05	4.087	0.5	1.55
	Intermed	4.18	0	0	0	4.087	0.09			
	Final	4.54	1	1	4.54	4.587	0.05			
	Total	12.26	0	2	1	12.261	0.19			
Shot at the goalpost from midfield	Initial	6.81	-1	1	-6.81	6.733	0.08	7.873	1.14	1.31
	Intermed	7.72	0	0	0	7.873	0.15			
	Final	9.09	1	1	9.09	9.013	0.08			
	Total	23.62	2	2	2.28	23.619	0.31			
6x6 bilateral game	Initial	7.18	-1	1	-7.18	7.18	0	8.36	1.18	0
	Intermed	8.36	0	0	0	8.36	0			
	Final	9.54	1	1	9.54	9.54	0			
	Total	25.08	0	2	2.36	25.08	0			

Table 9. Estimates of the values for the variation coefficients in the case of the adjusted function of the second degree, in the hypothesis concerning the parabolic evolution of the average for the following tests

Tests	**Phase of the test**	**Average** $\bar{x}$	**PARABOLIC TREND**								
			t_i^2	t_i^4	$t_i^2 \cdot x_i$	$x_{ti} = a + bt_i + ct_i^2$	$\lvert x_i - x_{t_i} \rvert$	a	b	c	**v (%)**
Squat jump	Initial	2.03	1	1	2.03	2.03	0	2.07	0.05	0.01	0
	Intermed	2.07	0	0	0	2.07	0				
	Final	2.13	1	1	2.13	2.13	0				
	Total	6.23	2	2	4.16	6.23	0				
1000 m run	Initial	4.22	1	1	4.22	4.22	0	4.12	-0.095	0.005	0
	Intermed	4.12	0	0	0	4.12	0				
	Final	4.03	1	1	4.03	4.03	0				
	Total	12.37	2	2	8.25	12.37	0				
Passing in three	Initial	3.54	1	1	3.54	-3.54	0	4.18	0.5	-0.14	0
	Intermed	4.18	0	0	0	4.18	0				
	Final	4.54	1	1	4.54	4.54	0				
	Total	12.26	2	2	8.08	12.26	0				
Shot at the goalpost from midfield	Initial	6.81	1	1	6.81	6.81	0	7.72	1.14	0.23	0
	Intermed	7.72	0	0	0	7.72	0				
	Final	9.09	1	1	9.09	9.09	0				
	Total	23.62	2	2	15.9	23.62	0				
6x6 bilateral game	Initial	7.18	1	1	7.18	7.18	0	8.36	1.18	0	0
	Intermed	8.36	0	0	0	8.36	0				
	Final	9.54	1	1	9.54	9.54	0				
	Total	25.08	2	2	16.72	25.08	0				

Table 10. Estimates of the values for the variation coefficients in the case of the adjusted exponential function, in the hypothesis concerning the exponential evolution of the average for the following tests

Tests	**Phase of the test**	**Ave-rage** $\bar{x}$	**EXPONENTIAL TREND**								
			t_i	$\lg x_i$	$t_i \lg x_i$	$\lg x_{t_i} = \lg a + t_i \cdot \lg b$	$x_{t_i} = ab^{t_i}$	$\lvert x_i - x$	$\lg a$	$\lg b$	**V (%)**
Squat jump	Initial	2.03	-1	0.3074960	-0.30749603	0.306840212	2.0269	0.003	0.317281995	0.010441783	0.19
	Intermed	2.07	0	0.3159703	0	0.317281995	2.0762	0.006			
	Final	2.13	1	0.3283796	0.328379603	0.327723778	2.1267	0.003			
	Total	6.23	0	0.9518459	0.020883566		6.2299	0.012			
1000 m run	Initial	4.22	-1	0.6253124	-0.62531245	0.625175273	4.219	0.001	0.615171571	-0.010003702	0.04
	Intermed	4.12	0	0.6148972	0	0.615171571	4.122	0.003			
	Final	4.03	1	0.6053050	0.60530504	0.605167869	4.028	0.001			
	Total	12.37	0	1.8455146	-0.02000740		12.369	0.005			
Passing in three	Initial	3.54	-1	0.5490032	-0.54900326	0.55505217	3.590	0.05	0.609078465	0.054026295	0.90
	Intermed	4.18	0	0.6211763	0	0.621176281	4.180	0			
	Final	4.54	1	0.6570558	0.65705582	0.66310476	4.604	0.06			
	Total	12.26	0	1.8272353	0.10805259			0.11			
Shot at the goalpost from midfield	Initial	6.81	-1	0.8331471	-0.83314711	0.830401045	6.77	0.04	0.893109431	0.062708386	0.76
	Intermed	7.72	0	0.8876173	0	0.893109431	7.82	0.10			
	Final	9.09	1	0.9585638	0.958563883	0.955817817	9.03	0.06			
	Total	23.62	0	2.6793282	0.125416772		23.63	0.20			

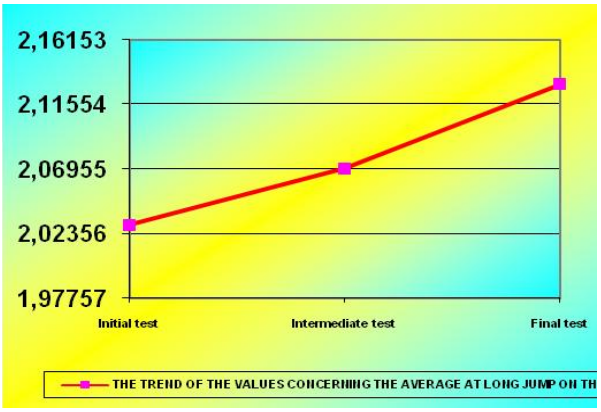
6x6 bilateral game	Initial	7.18	-1	0.8561244	-0.85612444	0.857581066	7.20	0.02	0.91 9293 031	0.06 1711 965	0.44
	Intermed	8.36	0	0.9222062	0	0.919293031	8.30	0.06			
	Final	9.54	1	0.9795484	0.979548374	0.980944996	9.57	0.03			
	Total	25.08	0	2.7578790	0.12342393		25.07	0.11			

Table 11. Reflection of the models concerning the trends of the values for the averages calculated in the case of the driving tests

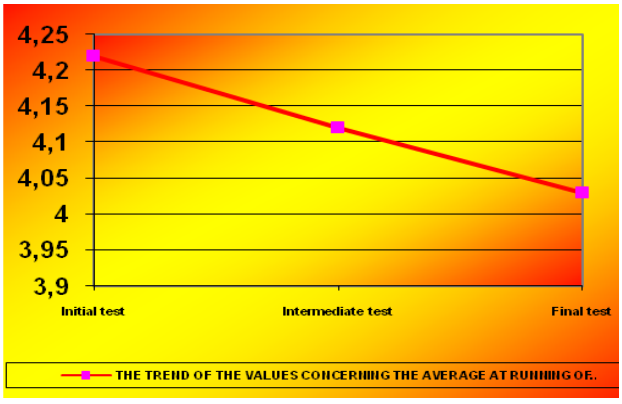
Tests	The method concerning the coeficients of variation	The model of the trend
50 m dash	$v_I = 0{,}23\% < v_{\exp} = 0{,}64\% < v_{II} = 33{,}44\%$	$x_{ti} = a + b \cdot t_i$ (linear trend)
Squat jump	$v_{II} = 0\% < v_{\exp} = 0{,}19\% < v_I = 0{,}21\%$	$x_{t_i} = a + b \cdot t_i + ct_i^2$ (parabolic trend)
1000 m run	$v_{II} = 0\% < v_{\exp} = 0{,}04\% < v_I = 0{,}06\%$	$x_{t_i} = a + b \cdot t_i + ct_i^2$ (parabolic trend)
Passing in three	$v_{II} = 0\% < v_{\exp} = 0{,}90\% < v_I = 1{,}55\%$	$x_{t_i} = a + b \cdot t_i + ct_i^2$ (parabolic trend)
Shot at the goalpost from midfield	$v_{II} = 0\% < v_{\exp} = 0{,}76\% < v_I = 1{,}31\%$	$x_{t_i} = a + b \cdot t_i + ct_i^2$ (parabolic trend)
6x6 bilateral game	$v_I = 0\% = v_{II} = 0\% < v_{\exp} = 0{,}44\%$	$x_{ti} = a + b \cdot t_i$ (linear trend)

Table 12. Forecasts concerning the evolutions of the values for the averages calculated in the case of the driving tests

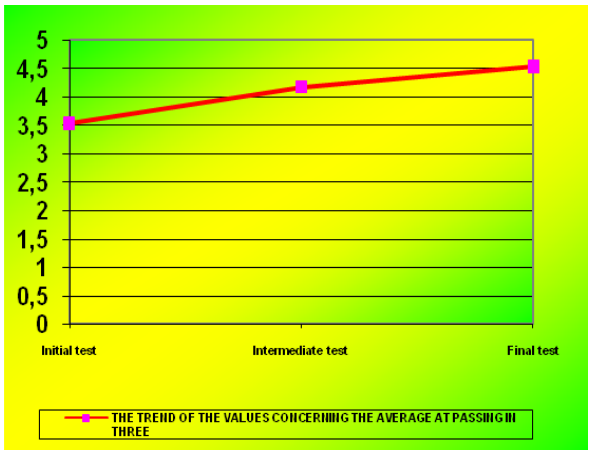
Tests	Forecasts of the averages (t+1 period)
50 m speed running	$x_{ti} = a + b \cdot t_i = 7{,}23 + (-0{,}275) \cdot 2 = 6{,}68$ seconds
Squat jump	$x_{t_i} = a + b \cdot t_i + ct_i^2 = 2{,}07 + 0{,}05 \cdot 2 + 0{,}01 \cdot 4 = 2{,}21$ m
1000 m run	$x_{t_i} = a + b \cdot t_i + ct_i^2 = 4{,}12 - 0{,}095 \cdot 2 + 0{,}005 \cdot 4 = 3{,}95$ seconds
Passing in three	$x_{t_i} = a + b \cdot t_i + ct_i^2 = 4{,}18 + 0{,}5 \cdot 2 - 0{,}14 \cdot 4 = 4{,}62$
Shot at the goalpost from midfield	$x_{t_i} = a + b \cdot t_i + ct_i^2 = 7{,}72 + 1{,}14 \cdot 2 + 0{,}23 \cdot 4 = 10{,}92$
6x6 bilateral game	$x_{ti} = a + b \cdot t_i = 8{,}36 + 1{,}18 \cdot 2 = 10{,}72$



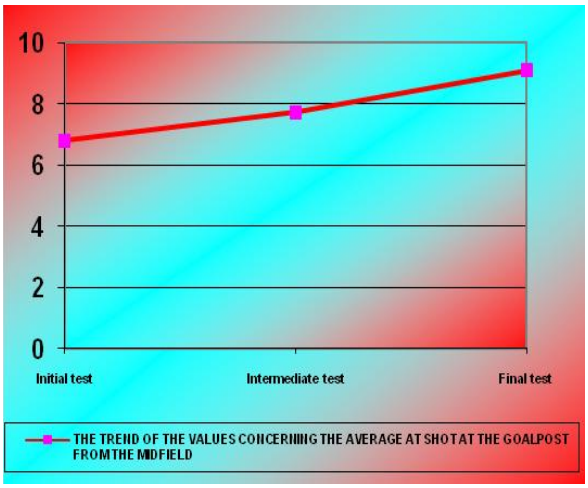
Type 2. Parabolic model of the average concerning the squat jump



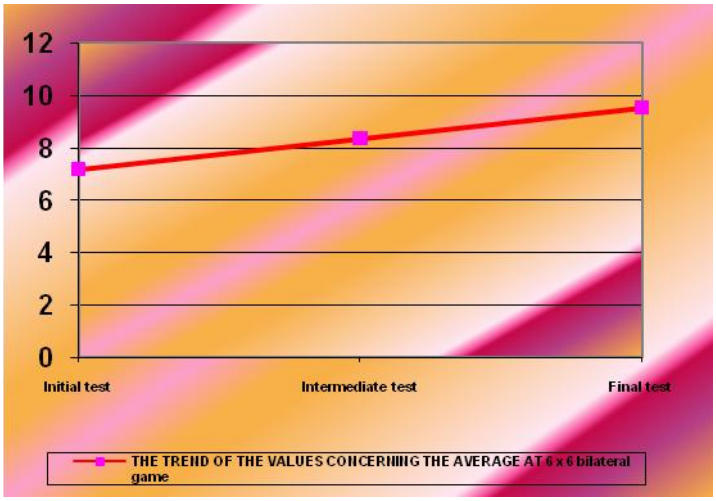
Type 3. Parabolic model of the average concerning the 1000 m run



Type 4. Parabolic model of the average concerning the passing in three



Type 5. Parabolic model of the average concerning the shot at the goalpost from the midfield



Type 6. Linear model of the average concerning the 6x6 bilateral game

The shape of the player at the end of the training session

1. Perfect health.
2. Anthropometrical and morphofunctional criteria within the age average:
   - vital capacity;
   - pulse supine and after exercise;
   - ability chest;
   - cardiovascular complete their development towards the end;
   - increase in volume and myocardial mass.
3. Technical training:
   - individualization technical preparations player to achieve "universal-independent" able to meet job requirements of the team;
   - can start orientation or specialization lines for attack and defence departments under adversity;
   - improvement of specific technical means to increase the effectiveness of rehabilitation, construction and completion;
   - improving takeovers under "pressure" opponent;
   - shot on goal in force, in turn, on the corner short or long;
   - execution of free kicks from different distances and under different angles;
   - completion of the diversion or dive head;
   - improvement of technical virtuosity in terms of performance.
4. Physical training
   - increased exercise capacity by increasing the number of training sessions and games;
   - development of individual capacities of driving skills and increased aerobic exercise capacity;
   - progressive and intensive application of the main muscle groups and large functions;
   - improved mobility, flexibility and skill;
   - development of force (power) and struggle resistance with opponents;
   - improved ball striking force head and foot.
5. Theoretical
   - knowledge-date information on the level and value of preparing children at home;
   - knowledge of the concept of team play and tactics, forms of exercise, the importance and effects of control samples;
   - knowing and accepting forms of selection requirement;

- optimization of civic behavior in all forms and on all occasions;
- knowledge and implementation of the concept of sporting life.

6. Psychological preparation
- finalizing the contours of personality, character and profile of fighter-winner;
- ability to focus attention;
- intelligence for learning capacity;
- conscientiousness;
- sense of anticipation;
- psychological resistance to stress;
- courage.

7. Distribution of the training components: 30% - physical training, 50% - technical training, 5% - tactical training, 2% - theoretical preparation, 3% - psychological preparation and 10% - biological preparation [1].

CONCLUSIONS

Because the results of the research were positive and the progress between the initial and the final tests was visible, the research conducted at F.C.M. Dunarea Galati confirmed the effectiveness of the physical-technical training of the players. This is also emphasized by the statistical analysis.

The physical-technical training of the F.C.M. Dunarea Galati fooftball team is well-balanced and correctly conceived.

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