THE STATISTICAL ANALYSIS OF THE FOOTBALL INFLUENCES' OVER THE EVOLUTION OF THE MORPHOLOGICAL VARIABLES

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Abstract
In this research we reflect the effect of the football over of the development concerning the body of the footballers. The purpose of this research consists in to have a permanent connection with the practical activity regarding the physical development of the bodies for the players who are components from F.C.M. Dunarea Galati (experimental team) compared to the morphological values concerning a witness team (L.P.S. Galati). The both teams, F.C.M. Dunarea Galati team, respectively L.P.S. Galati team are maked up from 17 players of (14-16) years. The methods of the research used are: the statistical method, the scientifical documentation, the experimental method and observation method.
Key words*: morphological parameters; absolute deviation, indexes, tests, experimental team, witness team.*

INTRODUCTION

The research reflects the effects of the efforts concerning the game of the football, over the development of the body for the footballers of (14-16) years. The analysis of these influences it achieves by means of sportive biosomatics discipline which studies the morphological and functional parameters of the uman body and researchs the effects of the sports over the body, respectively the structural, biochemical and functional changes at cellular, organic and semantic level, showed through the changes regarding the shape of the body and the obtaining of the different driving qualities [9]. The state of the art in this domain is represented by the essential research belongs to (Epuran M., 1979) who elaborated a methodology concerning the research of the body activities [8].

AIM

The aim of the theme proposed for research consists in to follow the values concerning the morphological parameters concerning two teams of football with players of (14 -16) years, time of a year, for to examine the morphological data taked in an individual mode and to calculate the general averages on experimental team which will be compared with the values of the witness team.

HYPOTHESIS

This paper has the next hypothesis: we suppose that the achievement of the specific trainings in football (aerobic effort and anaerobic effort) will have considerable effects over the development concerning the body of the footballers.

MATERIAL AND METHODS

The experimentul it carried out on the period 2013-2014 at F.C.M. Dunarea Galati and L.P.S. Galati and in research we included the footballers of (14-16) years. In the aim of the achievement concerning this paper, we used the next research methods: the scientifical documentation, the statistical method and the observation method.

In this research, we achieved the nexts tests: weight; height; thoracic perimeter in rest; thoracic perimeter in inspiration; thoracic perimeter in expiration; elasticity; abdominal diameter; amplitude; bust; biacromial diameter; bitrohanterian diameter.

The tests were assessed in kilograms and centimeters. The tests were applied in two stages: the initial in October 2013 and final in May 2014.

RESULTS OF THE RESEARCH

MORPHOLOGICAL TESTS
Table no. 1 Initial tests for F.C.M. Dunarea Galati team

No.	Name and first name	Weight	Height (cm)	THORACIC PERIMETER				DIAMETER				
				Rest	Inspiration	Expiration	Elasticity	Abdo-men	Am-pli-tude	Bust	Biacromial	Bitro-hanterian
1.	BA	68	183	91	95	89	6	80	173	85	41	37.5
2.	AS	61	171	83	88	80	8	75	165	82	34	29
3.	RT	58	176	80	84.5	77.5	7	70	160	78	33.5	27
4.	DR	62	174	82	87.5	80.5	7	74	164	81	35	32.5

5.	SE	60	173	80.5	86	77.5	8.5	71	161	79	34	29
6.	GI	58	170	78.5	83.5	74.5	9	70	159	78	33.5	21
7.	BC	59	168	79	84.5	75	9.5	71	160	73	31	21
8.	SC	58	169	77.5	83	73.5	9.5	70	159	75	32	29.5
9.	FS	57	167	77	82.5	73	9.5	71	160	78	33.5	31.5
10.	HV	59	168	79	84.5	76	8.5	72	163	79	34	29
11.	NA	62	169	80.5	86	78	8	71	163	75	32	29.5
12.	CS	59	165	77.5	83	73.5	9.5	72	160	80	35.5	32
13.	ZA	61	173	83.5	88	80.5	7.5	75	168	82	36	31.5
14	RS	60	175	81	85.5	78	7.5	73	162	78	34	29
15	CE	63	171	80.5	86	77.5	8.5	73	161	77	34	29
16	SB	65	170	81	86	77.5	8.5	72	163	76	32	27
17	VE	63	176	81.5	86	78	8	72.5	164	77	34	29
$\bar{x}$		60,76	171,65	80,75	85,85	77,62	8,23	72,5	162,64	78,41	34,06	29,06

Table no. 2 Final tests for F.C.M. Dunarea Galati team

No.	Name and first name	Weight	Height (cm)	THORACIC PERIMETER				DIAMETER				
				Rest	Inspiration	Expiration	Elasticity	Abdo-men	Am-pli-tude	Bust	Biacromial	Bitro-hanterian
1.	BA	69	184	95	99	90	6	86	178	88	43.5	41
2.	AS	62	172	87	93	83	8.5	81	170	85	37.5	40.5
3.	RT	60	177	84	88	80	6.5	76	166	82	38	32
4.	DR	63	175	86	92	82	9.5	79	171	84	38.5	30
5.	SE	60	174	84	89	80	9	76	166	83	38	36
6.	GI	59	171	83	82.5	78	10	75	166	82	37	33
7.	BC	60	169	83	88.5	76	11	75	165	77	35	30
8.	SC	59	170	81	88	77.5	9.5	74	163	78	36	33
9.	FS	60	168	82	87	76	9.5	75	168	81	38	34.5
10.	HV	60	169	83	86.5	80	7	76	167	83	37	33
11.	NA	62	170	85	90	81.5	7.5	75.5	168	79	36.5	33
12.	CS	60	166	83	87	76	10	77	165	84	39	34
13.	ZA	61	174	88	92	83	8	81	171	85	38.5	34.5
14	RS	60	176	85.5	89.5	81.5	7	78.5	168	81	37.5	33
15	CE	64	172	85	90	80	9	79	167	80	37.5	33
16	SB	65	171	85	91	80	9.5	77	168	81	37	32
17	VE	64	177	86	89.5	81	7	78	169	80	38	33
$\bar{x}$		61,65	172,65	85,03	89,56	80,32	8,50	77,59	168	81,94	35,79	33,85

Table no. 3 Initial tests for L.P.S. Galati team

No.	Name and first name	Weight	Height (cm)	THORACIC PERIMETER				DIAMETER				
				Rest	Inspiration	Expiration	Elasticity	Abdo-men	Am-pli-tude	Bust	Biacromial	Bitro-hanterian
1.	AS	65	179	89	93	87	6	78	170	83	39	36.5
2.	CS	60	169	81	87	79.5	7.5	73	163	80	32	28
3.	BR	57	172	79	83.5	75	8.5	68	158	76	31.5	26
4.	GV	59	172	80	86.5	77	9.5	72	162	79	33	31
5.	RS	58	171	79.5	85	78	7	69	159	77	32	27
6.	BF	57	169	77.5	82.5	76	6.5	68	157	76	31.5	25.5
7.	FR	58	168	78	81.5	73.5	8	67	158	71	30	25.5
8.	NS	57	168	76.5	81	74	7	67	157	73	31	28
9.	SA	56	166	76	80.5	73.5	7	68	158	76	31.5	29.5
10.	CR	57	167	77	82.5	76	6.5	69	160	79	32	27
11.	BT	60	167	79.5	83	77	6	68	161	73	30	27.5
12.	FC	58	163	76.5	81	75.5	6.5	69	158	77	33.5	29
13.	RC	59	171	81.5	86	78.5	7.5	71	165	79	34	29.5
14	NR	58	172	79	82.5	76	6.5	70	160	76	32	27
15	AT	60	169	79.5	84	78.5	5.5	70	159	75	32	27
16	BS	61	170	79	84	78	6	69	160	74	30	25.5

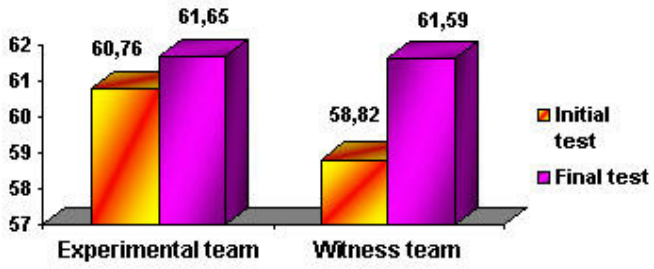
17	MS	60	167	80.5	83.5	77.5	6	70.5	161	75	32	27
$\bar{x}$		58,82	169,41	79,35	79,71	77,09	6,91	69,79	160,35	76,41	32,18	28,03

Table no. 4 Final tests for L.P.S. Galati team

No.	Name and first name	Weight	Height (cm)	THORACIC PERIMETER				DIAMETER				
				Rest	Inspiration	Expiration	Elasticity	Abdo-men	Am-pli-tude	Bust	Biacromial	Bitro-hanterian
1.	AS	67	182	92	95	88	7	80	172	85	41	38.5
2.	CS	64	172	83	89	80.5	8.5	75	167	83	34	31
3.	BR	60	174	81	85.5	76	9.5	71	162	79	33.5	29
4.	GV	61	174	82	88.5	78.5	10	74	164	83	35	33
5.	RS	61	173	81.5	87	80	7	72	163	82	34	30
6.	BF	59	173	79.5	84.5	77.5	7	72	161	79	33.5	28.5
7.	FR	61	172	80	83.5	75	8.5	71	161	74	33	28.5
8.	NS	60	171	79.5	83	75.5	8	70	162	76	33	30
9.	SA	62	169	79	82.5	75	7.5	71	161	79	33.5	31.5
10.	CR	60	170	80	84.5	77	7.5	72	163	81	34	30
11.	BT	63	171	81.5	85	78	7	71	163	76	32	29.5
12.	FC	60	167	78.5	83	76.5	6.5	71	160	80	35.5	31.5
13.	RC	61	173	73.5	88	77.5	10.5	73	168	82	36	31.5
14	NR	61	174	81.5	84.5	77	7.5	72	162	79	34	29.5
15	AT	62	172	82	85	79.5	6.5	73	162	79	34	30
16	BS	63	173	82.5	85	79	7	71	163	78	33	29.5
17	MS	62	170	83	84.5	79	6.5	72.5	164	79	34	31
$\bar{x}$		61,59	172,35	81,18	85,94	85,76	7,76	72,44	163,41	79,65	34,29	30,73

If we analyse the tables no. 2-4¸ we observe that:

1) weight:
- the experimental team: the initial average is 60,76 kg. and the final average is 61,65 kg. The progress between the initial average and final average is 0,89 kg.
- the witness team: the initial average is 58,82 kg. and the final average is 61,59 kg. So, the increase between the initial average and final average is 2,77 kg.



The type no.1 The comparative analysis between the experimental team and witness team at the weight test

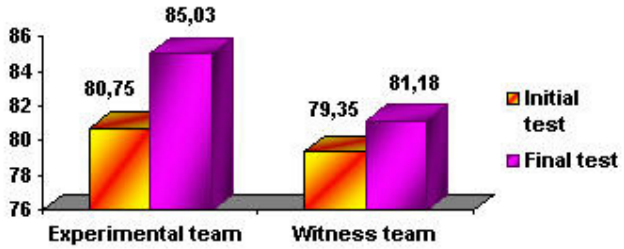
2) height:
- the experimental team: the initial average is 171,65 cm and the final average is 172,65. The increase between the initial average and final average is 1 cm.
- the witness team: the initial average is 169,41 cm and the final average is 172,35 cm. Thus, the progress between the initial average and final average is 2,94 cm

Type no. 2 The comparative analysis between the experimental team and witness team at the height test

3) thoracic perimeter in rest:

- the experimental team: the initial average is 80,75 cm and the final average is 85,03 cm. The progress between the initial average and final average is 4,28 cm.

- the witness team: the initial average is 79,35 cm and the final average is 81,18 cm. Consequently, the growth between the initial average and final average is 1,83 cm.



Type no. 3 The comparative analysis between the experimental team and witness team at the thoracic perimeter in rest test

4) thoracic perimeter in inspiration:

- the experimental team: the initial average is 85,85 cm and the final average is 89,56 cm. Therefore, the progress between the initial average and final average is 3,71 cm.

- the witness team: the initial average is 79,71 cm and the final average is 85,94 cm. Hence, the increase between the initial average and final average is 6,23 cm.

Type no. 4 The comparative analysis between the experimental team and witness team at the thoracic perimeter in inspiration test

5) thoracic perimeter in expiration:

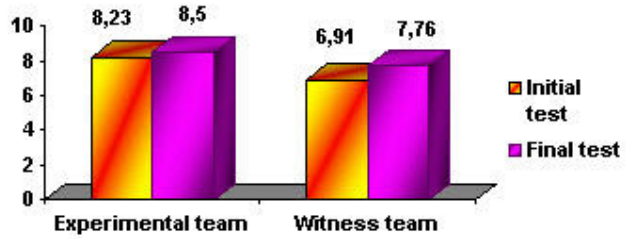
- the experimental team: the initial average is 77,62 cm and the final average is 81,50 cm. So, the growth between the initial average and final average is 3,88 cm.

- the witness team: the initial average is 77,09 cm and the final average is 80,32 cm. Consequently, the progress between the initial average and final average is 3,23 cm.

Type no. 5 The comparative analysis between the experimental team and witness team at the thoracic perimeter in expiration test

6) elasticity:

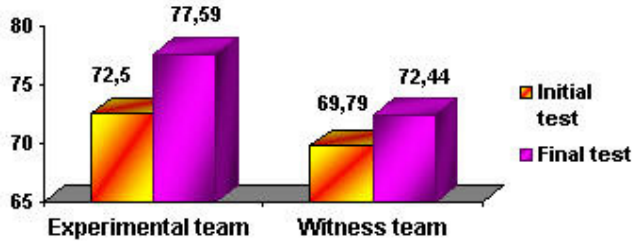
- the experimental team: the initial average is 8,23 and the final average is 8,50 cm. Thus, the progress between the initial average and final average is 0,27.
- the witness team: the initial average is 6,91 cm and the final average is 7,76. So, the increase between the initial average and final average is 0,85.



Type no. 6 The comparative analysis between the experimental team and witness team at the elasticity test

7) abdominal diameter:

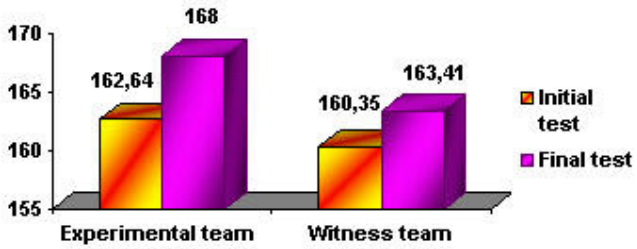
- the experimental team: the initial average is 72,5 cm and the final average is 77,59 cm. The increase between the initial average and final average is 5,09 cm.
- the witness team: the initial average is 69,79 cm and the final average is 72,44 cm. Thus, the growth between the initial average and final average is 2,65 cm.



Type no. 7 The comparative analysis between the experimental team and witness team at the abdominal diameter test

8) amplitude:

- the experimental team: the initial average is 162,64 cm and the final average is 168 cm. The progress between the initial average and final average is 5,36 cm.
- the witness team: the initial average is 160,35 cm and the final average is 163,41 cm. Consequently, the increase between the initial average and final average is 3,06 cm.



Type no. 8 The comparative analysis between the experimental team and witness team at the amplitude test

9) bust:

- the experimental team: the initial average is 78,41 cm and the final average is 81,94 cm. The growth between the initial average and final average is 3,53 cm.

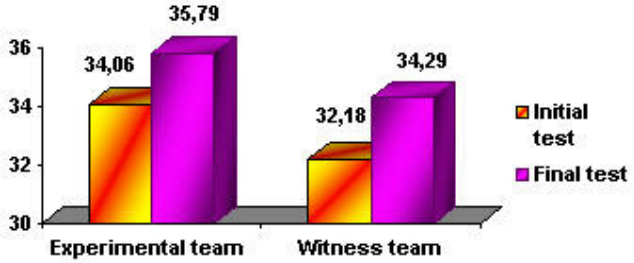
- the witness team: the initial average is 76,41 cm and the final average is 79,65 cm. Hence, the progress between the initial average and final average is 3,24 cm.

Type no. 9 The comparative analysis between the experimental team and witness team at the bust test

10) biacromial diameter:

- the experimental team: the initial average is 34,06 cm and the final average is 35,79 cm. The progress between the initial average and final average is 1,73 cm.

- the witness team: the initial average is 32,18 cm and the final average is 34,29 cm. So, the increase between the initial average and final average is 2,11 cm.



Type no. 10 The comparative analysis between the experimental team and witness team at the biacromial diameter test

11) bitrohanterian diameter:

- the experimental team: the initial average is 29,06 cm and the final average is 33,85 cm. The growth between the initial average and final average is 4,79 cm.

- the witness team: the initial average is 28,03 cm and the final average is 30,73 cm. Thus, the increase between the initial average and final average is 2,7 cm.

Type no. 11 The comparative analysis between the experimental team and witness team at the bitrohanterian diameter test

Table no. 5 The comparative analysis between the experimental team and the witness team

Morphological parameters	The arithmetical average – final test		Absolute deviation	Indexes
	The experimental team	The witness team	$\Delta^{morphological\_parameter}_{experimental/witness}$	$I^{morphological\_parameter}_{experimental/witness}$ (%)
Weight	61,65	61,59	0,06	99,90
Height	172,65	172,35	0,30	99,83
Thoracic perimeter in rest	85,03	81,18	3,85	95,47
Thoracic perimeter in inspiration	89,56	85,94	3,62	95,96
Thoracic perimeter in expiration	81,50	80,32	1,18	98,55
Elasticity	8,50	7,76	0,74	91,29
Abdominal diameter	77,59	72,44	5,15	93,36
Amplitude	168,00	163,41	4,59	97,27
Bust	81,94	79,65	2,29	97,21
Biacromial diameter	35,79	34,29	1,50	95,81
Bitrohanterian diameter	33,85	30,73	3,12	90,78

In conclusion, we can say that the results obtained by the experimental team (F.C.M. Dunarea Galati) were superior comparative to the results of the witness team (L.P.S. Galati). Thus, the progress of the experimental team was:

- 0,06 kg at the weight test;
- 0,3 cm at the height test;
- 3,85 cm at the thoracic perimeter in rest;
- 3,62 cm at the thoracic perimeter in inspiration;
- 1,18 cm at the thoracic perimeter in expiration;
- 0,74 at the elasticity;.
- 5,15 cm at the abdominal diameter;
- 4,59 cm at the amplitude test;
- 2,29 cm at the bust test;
- 1,50 cm at the biacromial diameter test;
- 3,12 cm at the bitrohanterian diameter test.

CONCLUSIONS

- We observe the increase concerning the rhythm of growth or him variation on periods (fast increase, then a slowness of the increase followed by a explosive increase.
- Also, there is a permanent increase concerning the curve of the weight, a growth regarding the sizes of the chest, simultaneously with the increase of the superior and inferior limbs; the bust registers an important growth.

Consequently, the experimental team (F.C.M. Dunarea Galați) tends to biosomatic biotype which it's specifically for the player of football, reflected by:

- a physical profile: middle-high waist, speed in system for explosive power, optimal weight, etc.
- a psychical profile: tactical intelligence, resistance at stress, driving coordination, concentrated and distributive attention, speed of reaction, etc.
- metabolic support (anaerobical and aerobical effort).

- We propose for the coachs to observe in continuation the waist of the footballers, their driving qualities, with increased accent in the modelation concerning the biosomatic profile which musts be the ideal profile [9].
- We propose the planning and the determination through intermediate tests of the level regarding the physical preparation of the team, in the same time with biosomatic qualities and the metabolic support (aerobical effort, respectively anaerobical effort).

REFERENCES

1. Cojocaru V., (2000). *The strategy of the preparation for the youngers of high performance"*, Axis Mundi Publishing House, Bucharest, p. 26-40.
2. Dragan A., (2006). *Football for youngers*, Valinex Publishing House, Chisinau, p. 47-78.
3. Dragan A., (2006). *Football – conceptions, methods and means*, Mongabit Publishing House, Galati, p.38-42.
4. Dragan A., (2007). *Interdiscipliners approachs in football*, Academica Publishing House, Galaţi, p. 26-72.
5. Dragan A., (2009). *The optimization of the lesson of training at the discipline football*, Galati University Press Publishing House, Galaţi, p. 180-216.
6. Dragan A., (2013). *Driving games*, University Foudation of "Dunarea de Jos" Publishing House, Galaţi, p. 74-87.
7. Dragan A., (2013). *Driving and functional evaluation*, University Foundation of Dunarea de Jos" Publishing House, Galaţi, p. 46-79.
8. Epuran M., (1979). *The methodology of the research concerning the body activities*, I.E.F.S. Publishing House, Bucharest, p. 87-114.
9. Melenco I., (2012). *Driving and functional evaluation* , Ovidius University – Publishing House, Constanta, p. 24-76.
10. Opait G., (2006). *Statistics*, University Foundation of Dunarea de Jos University - Publishing House, Galaţi, p. 64-78.
11. Radulescu M., Cojocaru V., Dragan A., (2003). *The guide of football coach at children and young players*, Axis-Mundi Publishing House, Bucharest, p. 74-82.