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CORRELATIONS REGARDING THE INDICATORS RESULTED FROM THE EVALUATION OF THE VERTICAL TAKE-OFF, USING THE MODIFIED MIRON GEORGESCU BOARD

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ABSTRACT

This paper is the result of a research regarding the correlations between the indicators calculated through the 15 Jumps Test. The study followed 15 boys and 15 girls between the age of 8 and 18. We tried to emphasize the dynamics of the correlations between the take-off height and the 10 indicators calculated by a special program. For the evaluation of the take-off height we used the "15 Jumps Test", recorded with the "modified Miron Georgescu" sensor board. The results were recorded and analyzed with the "Microsoft Office Excel 2003" and "SPSS" (Statistical Package for Social Science) software. The conclusions of this study show that there are in boys and in girls, positive correlations between the average take-off height (H jump) and the unit power, maximum take-off height, accomplished maximum unit power and the maximum possible unit power, with values between 0,843 and 0,989. The values are closer to 1 in girls, in comparison with the boys. It appears a reversed correlation between the average take-off height and the energy variability coefficient, whereas in other indicators we see alternating the non-correlation and the reversed correlation in girls and boys.

Keywords: correlations, take-off, evaluation, indicators

I. INTRODUCTION

Study the relationship between height and power of detachment also the subject of several investigations in the literature and concluded "the greater the instantaneous power will be even higher rate of detachment, even if the average power is likely to be affected" (Gloria Rata, 2001, p. 108). Instantaneous power understood as "the ability to achieve the highest increase of force in the shortest time possible" depends on "the speed of fiber contraction speed and force of contraction number of fibers involved (J., Weineck, 1993,pag. 173). Power as explosiveness is similar to the impulse; it represents the singular, but every phase of increased strength and muscle quality of the nerves but also the dexterity to move towards the desired action.

The ratio of target-force-power, expressed specifically in the main indices of force sporting gestures, is "likely that imprisonment is placed, the curve of maximum power and maximum speed, closer to power than speed, an idea supported by Wilmore and Costil, 1998 who also emphasize that "presenting the appearance of explosive muscle strength of the force produced by movement speed. What speed is above all an innate quality, which is improved relatively by training, especially force is one that allows improved power, but power depends on the individual's age. The speed of transition from one phase to another, the process of achieving the 15 lessons, we provide crucial data on the height of the jumping power place and depends on "the reporting of breaking the height of body weight" (Mihai Epuran, 2005, p. 362) and is influenced by how quickly the work is carried out engineer.

II. OBJECTIVES

For this study we have set the following objectives:

- emphasizing the correlations between the analyzed indicators;
- a comparative emphasis of the correlations between the indicators resulted through the assessment with the modified Miron Georgescu board between girls and boys.

III. HYPOTHESIS

We started this study from the hypothesis that between all of the indicators there are positive correlations both in girls and in boys, and the highest value of the correlations is recorded in boys. The analysis of these correlations can underline the direction of action for enhancing the take-off jump.

IV. PROCEDURES AND RESEARCH METHODS

For this study we chose 30 subjects divided in two groups, of boys and girls, between 8 and 18 years old. They were selected from a larger group of 1200 students, some of them practicing competitive sports, and at that age they obtained the best result at the vertical take-off height.

Assessment methods

As evidence of evaluation we used the 'test of 15 jumps from two legs" by Miron Georgescu installation - changed. Facility via a computer interface coupled to a measuring time on land, air time and using a program automatically calculated

according to weight and energy parameters athlete neuromuscular control settings. "The equipment has established itself as an equipment of testing the force-velocity qualities in the lower limbs through the emphasis of the energy and control parameters" (Niculescu and Larisa Mugur Vladu, 2009, p. 134). Calculate indicators have special significance as the power average unit (PU) emphasizes character balance in the force-velocity relationship, the average height of flight (H_jump) is the parameter of force-speed with the dominant power, repetition rate (V_rep) is a parameter the dominant force-velocity speed, energy variability coefficient (CVE) is the difference between flying and tmpii make make the soil and characterized the control phase separation, the coefficient of structural variability (CVS), expresses the ability to control the phase mobility and rigidity of construction minimum time on the ground (TSOLm) is the lowest value of contact with the ground, maximum height (Hmax) is the greatest height reached by the center of gravity of the body, the maximum conducted power unit (PRM) is the power most developed when detachment, maximum jump power unit carried out (S. RMP) is to how much bounce out of 15 has made the greatest power and the maximum possible power unit (PMP) is about the maximum power.

V. RESULTS OF THE RESEARCH – ANALYSIS, INTERPRETATION AND GRAPHICAL REPRESENTATION

The data recorded in the control drills was organized and analyzed through the „Microsoft Office Excel 2003" software and the „SPSS" (Statistical Package for Social Sciences) software. The data interpretation was based on the analysis of the arithmetical mean between the maximum and minimum values and the Spearman correlation coefficient. The Spearman correlation coefficient was calculated through SPSS.

V. 1. Analysis of the correlations between the average jump height and the rest of the spring indicators in boys

Results of Spearman correlation coefficient allowed us statistical correlation analysis based on the results presented in Table 3 resulting from the processing of the Table 1 and 2, the correlation coefficient of ranks (Spearman) test the degree of correlation between 2 variables is qualitative and non-parametric alternative to "Pearson correlation coefficient. It can range between -1 and 1. If non-parametric correlation coefficient values are high, close to 1 when there is correlation between variables and stability if negative values are close to -1 indicates an inverse correlation, and the value approaches 0, then a correlation of variables.

From Table 3 are detached interesting aspects.

Between the average height of detachment (H jump) and mean power unit (PU) the correlation is 0.843 and points out the balance in the force-velocity relationship.

Between the height of detachment (H jump) and the maximum height of detachment (jump), which is the highest height reached the center of gravity of the body is a correlation of 0, 901.

Between the average height of detachment (H jump) and the maximum conducted power unit (RMP), understood as the most powerful developed when detachment is a linear correlation of 0.884.

Between the average height of detachment (H jump) and the maximum possible power unit (PMP), which is about the maximum power correlation is 0.880.

In conclusion the average height of detachment (H jump) and the power unit, the maximum height of detachment, the power unit and power unit made the highest maximum possible values are between 0.901 and 0.883, so close to the value 1, which emphasizes a linear correlation positive and stability among the five indicators.

Between the average height of detachment (H jump) and the rate of structural variability (CVS), which expresses the phase-control capability, mobility and rigidity of construction is a correlation of 0.404.

Between the average height of detachment (H jump) and lift the maximum conducted power unit (S. RMP), which is of how much bounce out of 15 of the biggest power is a correlation of 0.302.

As can be seen between the average height of detachment (H jump) coefficient of structural variability and the maximum conducted power unit, the values are between 0.404 and 0.302, so close to the value 0, which emphasizes that it is a correlation between these indicators.

Between the average height of detachment (H jump) and repetition rate (V_rep), which is a dominant parameter force-speed speed is a correlation of -0.372.

Between the average height of detachment (H jump) and coefficient of variability in energy (CVE), what is the difference between flying and times make the make the soil and characterized the control phase separation is a correlation of -0.027.

Between the average height of detachment (H jump) and the minimum time on the ground (TSOLm), which is the lowest amount of contact with the ground, is a correlation of -0.446.

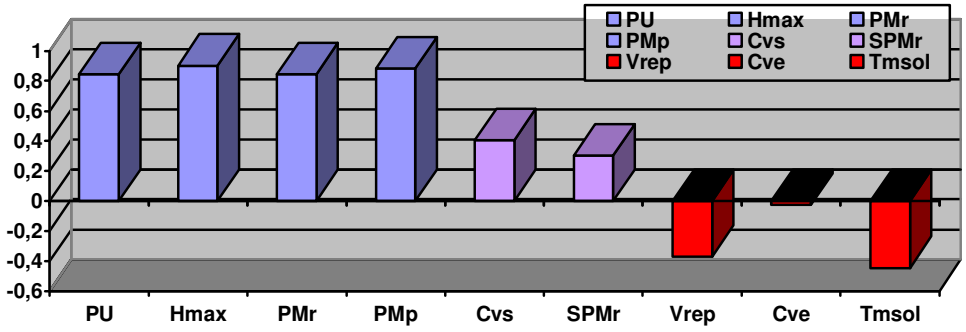
Also notice that the average height of detachment (H jump) and repetition rate, coefficient of variability in energy and minimum time on land

values are between -0.446 and -0.027, so close to -1,
which emphasizes a inverse correlation.

Table 3 - Correlations between the average jump height and the rest of the spring indicators in boys

BOYS: Spearman correlation coefficient		Average jump height (H.jump)	
	N	Correlation Coefficient	Sig. (2-tailed)
Average unit power (PU	15	0.843**	0.000
Average ground time (V_rep)	15	-0.372	0.172
Energy variability coefficient (CVE)	15	-0.027	0.924
Structural variability coefficient (CVS)	15	0.404	0.136
Average ground time (V_rep)	15	-0.446	0.095
Maximum height (HMax)	15	0.901**	0.000
Accomplished maximum unit power (PMr)	15	0.884**	0.000
Jump accomplished with the maximum unit power (S.PMr)	15	0.302	0.273
Maximum possible power unit (PMp)	15	0.880**	0.000
Valid N (listwise)	15	**. Correlation is significant at the 0.01 l *. Correlation is significant at the 0.05	

Chart 1 - Correlations between the average jump height and the rest of the spring indicators in boys



V. 2. Analysis of the correlations between the average jump height and the rest of the spring indicators in girls

The analysis of the results presented in Table 4 and Chart 2 emphasize interesting aspects regarding the correlations establishing between indicators.

Table 4 - Correlations between the average jump height and the rest of the spring indicators in girls

GIRLS: Spearman correlation coefficient		Average jump height (H.jump)	
	N	Correlation Coefficient	Sig. (2-tailed)
Average unit power (PU	15	0.963**	0.000
Average ground time (V_rep)	15	0.053	0.851
Energy variability coefficient (CVE)	15	-0.204	0.467
Structural variability coefficient (CVS)	15	0.305	0.270
Average ground time (V_rep)	15	-0.140	0.618
Maximum height (HMax)	15	0.989**	0.000
Accomplished maximum unit power (PMr)	15	0.960**	0.000
Jump accomplished with the maximum unit power (S.PMr)	15	-0.184	0.511
Maximum possible power unit (PMp)	15	0.964**	0.000
Valid N (listwise)	15	**. Correlation is significant at the 0.01 l *. Correlation is significant at the 0.05	

As we can see, there were correlations between the average take-off height (H jump) and:

- ✓ Average unit power (PU) with a value of 0,963;
- ✓ Maximum take-off height (jump) with a value of 0, 989;
- ✓ Accomplished maximum unit power (PMr) with a value of 0,960;
- ✓ Maximum possible power unit (PMp) with a value of 0,964.

In conclusion the average take-off height (H jump) and the unit power, a maximum height of detachment, the maximum conducted power unit and the maximum possible power unit, with values between 0.963 and 0.989, so close to the value 1 is a positive linear correlation.

Regarding the correlation between the average take-off height (H jump) and:

- ✓ Repetition speed (V. rep) has a value of 0,053;
- ✓ Structural variability coefficient (CVS) has a value of 0,305.

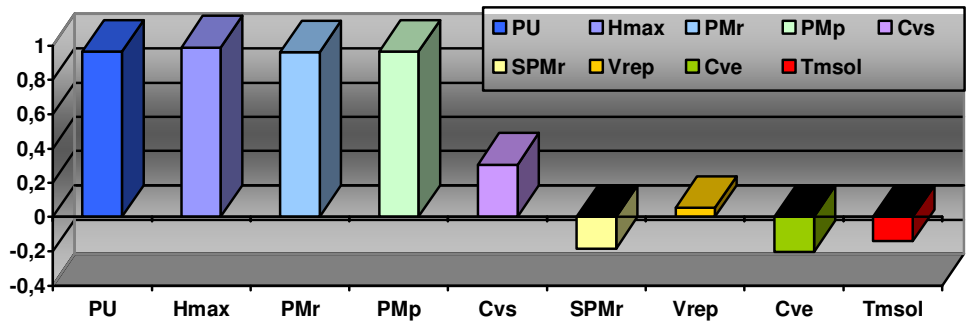
By following the correlation between the average take-off height (H jump) and the repetition speed and the structural variability coefficient we can see that the values are comprised between 0,053 and 0,305, close to 0, which underlined a non-correlation between these indicators.

The correlation between average take-off height (H jump) and

- ✓ Energy variability coefficient (CVE) has a value of –0,204;
- ✓ Minimum ground time (TSOLm) has a value of -0.140;
- ✓ Jump accomplished with the maximum unit power (S.PMr) has a value of -0.184.

Also we can see that between the average take-off height (H jump) and the energy variability coefficient, the minimum ground time and the jump accomplished with the maximum unit power, the values are comprised between -0,204 and -0,140, which is close to -1, underlining a reversed correlation.

Chart 2 - Correlations between the average jump height and the rest of the spring indicators in girls



V.3. Comparative analysis of the correlations between the average jump height and the rest of the spring indicators in girls

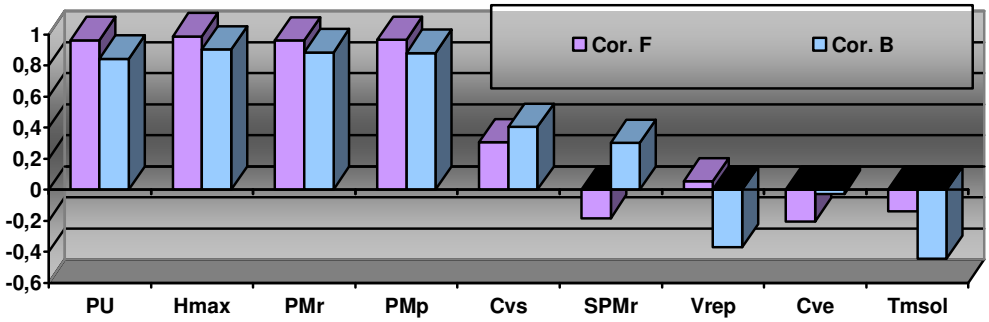
Between the analyzed indicators as we can see in Table 5 and Chart 3, there are differences regarding the calculated correlations.

Table 5 - Correlations between the average jump height and the rest of the spring indicators in boys and in girls

Spearman correlation coefficient		**Average jump height (H.jump)**	
	N	Correlation Coefficient BOYS	Correlation Coefficient GIRLS
Average unit power (PU	15	0.843**	0.963**
Average ground time (V_rep)	15	-0.372	0.053
Energy variability coefficient (CVE)	15	-0.027	-0.204
Structural variability coefficient (CVS)	15	0.404	0.305
Average ground time (V_rep)	15	-0.446	-0.140
Maximum height (HMax)	15	0.901**	**0.989****
Accomplished maximum unit power (PMr)	15	0.884**	**0.960****
Jump accomplished with the maximum unit power (S.PMr)	15	0.302	-0.184

Maximum possible power unit (PMp)	15	0.880**	**0.964****
Valid N (listwise)	15	**. Correlation is significant at the 0.01 l *. Correlation is significant at the 0.05	

Chart 3 - Correlations between the average jump height and the rest of the spring indicators in boys and in girls



It is noted between the average height of detachment (H jump) and the power unit, the maximum height of detachment, the power unit and power unit made the highest maximum possible positive correlations with values between 0.843 and 0.989. At the same time values are closer to 1 in girls compared with boys. It is further observed also a correlation between the average height of detachment and the rate of energy variability. The others indicators are found to be non-correlative or an inverse correlation.

CONCLUSIONS The analysis results revealed several important aspects.

1. The average height of boys between detachment (H aircraft) and the power unit, the maximum height of the maximum separation power unit and power unit carried a maximum possible values are between 0.901 and 0.883, so close to the value 1, which emphasizes a linear correlation positive and stability among the five indicators. Between the average height of detachment (H Flight) coefficient of variability in structural and unit power achieved maximum values are between 0.404 and 0.302, so close to the value 0, which emphasizes that it is a correlation between these indicators and the average height of detachment (H Flight), repetition rate, coefficient of variability in energy and minimum time on land values are between -0.446 and -0.027, so close to -1, which highlights an inverse correlation.

2. In girls between the average height of detachment (H aircraft) and the power unit, the maximum height of detachment, the maximum conducted power unit and the maximum possible power unit, with values between 0.963 and 0.989, so close to the value 1 is a linear correlation positive. The correlation between the average height of detachment (H aircraft) and the rate of repetition and structural variability coefficient has values between 0.305 and 0,0,053, so close to the value 0, which emphasizes that it is a correlation between these indicators and the height average separation (flight H) coefficient of variability in energy and minimum time on the floor and jump with maximum power values are between -0.204 and -0.140, so close to -1, which highlights an inverse correlation.

3. Comparing boys with girls we see that the average height of detachment (H aircraft) and the power unit, the maximum height of detachment, the maximum conducted power unit and power unit is the maximum possible positive correlations with values between 0.843 and 0.989. At the same time values are closer to 1 in girls compared with boys. It is further noted a correlation between the average height of detachment and the rate of energy variability and to the others is to link indicators are found either inverse correlation.

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Table 1- Vertical take-off and indicators for the assessment of the muscular force in the 8 and 18 years old boys

	Unit	Initials	A.	H.	W.	(PU)	(H_jump)	(V_rep)	(CVE)	(CVS)	(TSOLm)	(HMax)	(PMr)	(S.PMr)	(PMp)
1	Ferd.	P.A.	9	1,40	36	3,42	0,23	0,24	3,57	4,19	0,22	0,26	3,66	2	3,73
2	Ferd.	U.E.	12	1,73	60	3,67	0,27	0,27	7,07	4,51	0,26	0,33	4,09	6	4,2
3	Bad O	D.M.	12	1,54	40	4,13	0,27	0,18	2,49	7,39	0,17	0,29	4,37	2	4,41
4	Oneş.J	A.R.	10	1,35	32	3,25	0,28	0,37	4,79	11,81	0,31	0,31	3,71	7	3,75
5	Ferd.	N.V.	8	1,38	30	3,9	0,28	0,23	3,05	10,49	0,21	0,32	4,28	3	4,37
6	OneşJ	G.A.	11	1,50	35	4,09	0,30	0,24	4,63	7,33	0,21	0,36	4,44	8	4,69
7	L. lib. O	B.E.	13	1,59	50	4,6	0,31	0,17	3,26	9,44	0,14	0,36	4,97	7	5,16
8	. lib. O	P.A.	17	1,74	72	4,43	0,32	0,21	3,47	6,48	0,19	0,37	4,72	13	4,9
9	Bad O	T.A.	13	1,54	38	4,68	0,33	0,18	4,09	8,74	0,16	0,38	5,08	7	5,2
10	L. lib. O	P.S.	15	1,78	55	4,79	0,33	0,17	3,88	9,87	0,14	0,37	5,11	7	5,3
11	Ferd.	M.B.	17	1,76	54	4,53	0,34	0,23	5,50	13,96	0,19	0,41	5,15	10	5,25
12	OneşJ	C.C.	14	1,70	53	4,96	0,38	0,20	2,72	9,10	0,17	0,41	5,24	6	5,37
13	OneşJ	B.A.	15	1,60	44	4,77	0,39	0,25	3,82	4,99	0,22	0,45	5,28	10	5,37
14	Ferd.	H.B.	18	1,75	80	4,93	0,40	0,23	4,71	7,28	0,21	0,47	5,41	5	5,6
15	Ferd.	I.A.	16	1,70	54	5,18	0,43	0,23	1,77	10,86	0,20	0,46	5,55	5	5,57
Arithmetical mean			13,33	1,60	48,87	4,36	0,32	0,23	3,92	8,43	0,20	0,37	4,74	6,53	4,86
Standard deviation			3,04	0,15	14,53	0,59	0,06	0,05	1,31	2,78	0,04	0,06	0,61	3,02	0,63
Maximum value			18	1,78	80	5,18	0,43	0,37	7,07	13,96	0,31	0,47	5,55	13	5,6
Minimum value			8	1,35	30	3,25	0,23	0,17	1,77	4,19	0,14	0,26	3,66	2	3,73

Legend: Age (A), Height (H), Weight (W), Average unit power (PU), Average jump height (H_jump), Average ground time (V_rep), Energy variability coefficient (CVE), Structural variability coefficient (CVS), Minimum ground time (TSOLm), Maximum height (HMax), Accomplished maximum unit power (PMr) , Jump accomplished with the maximum unit power (S.PMr), Maximum possible power unit (PMp)

Table 2 - Vertical take-off and indicators for the assessment of the muscular force in the 8 and 18 years old girls

	Unit	Initials	A.	H.	W.	(PU)	(H_jump)	(V_rep)	(CVE)	(CVS)	(TSOLm)	(HMax)	(PMr)	(S.PMr)	(PMp)
1	Judo O	SM	8	1,37	32	3,12	0,17	0,17	3,14	4,9	0,16	0,19	3,42	11	3,43
2	Sc 28	SI	9	1,35	29	3,26	0,21	0,22	3,22	8,35	0,2	0,23	3,45	7	3,61
3	Sc 28	BM	9	1,43	31	3,28	0,21	0,22	4,38	***3,17***	0,21	0,25	3,64	8	3,76
4	Volley O	AA	12	1,67	49	3,56	0,22	0,19	3,63	4,74	0,18	0,25	3,73	11	3,88
5	Sc 28	TA	9	1,33	25	3,57	0,21	0,17	3,5	8,25	0,15	0,23	3,83	2	3,91
6	Judo O	R.R.	14	1,78	63	3,8	0,26	0,23	2,6	3,88	0,21	0,3	4,08	4,	4,13
7	Atl	H.I.	10	1,35	29	3,95	0,26	0,19	5,46	14,68	0,17	0,31	4,5	4	4,54
8	Volley O	AI	14	1,62	45	3,99	0,26	0,19	2,64	6,72	0,17	0,29	4,16	8	4,38
9	Atl	A.T.	11	1,53	38	4,07	0,28	0,2	3,6	5,78	0,18	0,32	4,29	13	4,50
10	L lib O	CC	15	156	47	4,23	0,29	0,2	3,87	7,14	0,18	0,34	4,52	3	4,69
11	Judo O	IM	18	163	60	4,48	0,31	0,18	2,48	8,15	0,16	0,34	4,75	4	4,90
12	Vol. O	CP	10	1,51	36	4,49	0,33	0,22	6,01	14,4	0,17	0,41	5,17	7	5,36
13	Wre L O	IA	13	1,57	42	4,49	0,28	0,15	4,01	5,12	0,13	0,32	4,85	9	4,87
14	Atl	D.I.	16	1,63	55	4,82	0,33	0,16	1,86	7,35	0,14	0,36	5,08	1	5,17
15	Atl	A.T.	15	1,75	57	4,83	0,38	0,22	2,38	7,00	0,2	0,42	5,24	10	5,28
Arithmetical mean			**12,2**	**22,59**	**42,53**	**4,00**	**0,27**	**0,19**	**3,52**	**7,31**	**0,17**	**0,30**	**4,31**	**6,80**	**4,43**
Standard deviation			3,05	55,60	12,36	0,56	0,06	0,02	1,14	**3,34**	0,02	0,07	0,62	3,65	0,62
Maximum value			18	163	63	4,83	0,38	0,23	6,01	**14,68**	0,21	0,42	5,24	13	5,36
Minimum value			8	1,33	25	3,12	0,17	0,15	1,86	**3,17**	0,13	0,19	3,42	1	3,43

Legend: Age (A), Height (H), Weight (W), Average unit power (PU), Average jump height (H_jump), Average ground time (V_rep), Energy variability coefficient (CVE), Structural variability coefficient (CVS), Minimum ground time (TSOLm), Maximum height (HMax), Accomplished maximum unit power (PMr) , Jump accomplished with the maximum unit power (S.PMr), Maximum possible power unit (PMp).