

## COMPARISON OF MORPHOLOGICAL VARIABLES AMONG 8<sup>th</sup> GRADE STUDENTS OF BOTH GENDERS IN IMPETUS LONG JUMPING PERFORMANCE

*(Original scientific paper)*

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### **Abstract**

*The aim of the project is mainly related to comparing morphological variables among 8<sup>th</sup> grade students of both genders in impetus long jumping performance. The study includes 60 primary school students, aged 14 and they were divided according to gender. In order to test we have used 15 variables, 14 of them as predictive morphological indicators and 1 as moving criterion. According to basic statistical parameters there were recorded normal rates, which are homogenous in between. In order to prove the significance between the measured genders there was used the T-test method, a method that proved the significance between these groups in morphological and moving variables. With the division of these results among boys and girls we have come to important differences in probability level .05 and .01. Whereas, through regressive analysis there was studied the morphological variables' expanse as predictor and impetus long jumping as criterion. Based on the regression partial coefficients, that hand length influence, (Beta= -.823) is highly important in .004 level, based on this, it is seen that impetus long jumping has negative impact. Whereas, parameters such as, thigh width, (Beta = .662) is highly important at level .027, according to this it is shown that impetus long jumping has a positive effect at girls' group. As presented previously, morphological indicators do not seem to have an important influence in predicting impetus long jumping results.*

**Keywords:** *boys, girls predictor variables, criterion variables, impetus long jumping, t-test, regression analysis*

### **INTRODUCTION**

In order to be able to recognize the morphological variables' expanse, which is, in fact, highly important field in getting higher sports results at young athletes. Recognizing morphological expanse is truly important even in increasing movement capacities; moreover it presents an important pre-condition in academic sports achievements, particularly in athletics. The correlation between moving and morphological expanse presents a pre-condition in selecting capable subjects in realizing particular moving tasks. The approach of morphological variables' expanse in manifesting impetus long jumping as well as determining the results of this technique compose the problem of this research.

The aim of this research is to compare morphological variables among 8<sup>th</sup> grade students of both genders in impetus long jumping. Another issue is the difference between morphological variables at both groups (8<sup>th</sup> grade students - boys and girls), as well as determining

the impetus long jumping performance through regressive analysis.

### **METHODS**

#### *Model (samples) of entities*

There were included 60 participants (students) aged 14 and were divided into two gender super modules, among them 30 schoolgirls and 30 schoolboys. The sample of this research indicates that all students have attended the PE class in a particular primary school called "Abdullah Krasnica" in Miratoc, a village near Preseva town. All schoolgirls are capable of attending PE lessons, and all of them have realized particular tasks that were included in the 8<sup>th</sup> grade curriculum.

#### *Variables' sample:*

In order to define the field of morphological variables, there were used 15 variables as measuring instruments, 14 of them as predictive morphological indicators and 1 as moving criterion.

*Predictable Variables:*

Body Weight(BOWE); Body Height(BOHE); BodyHeightwhilesitting(BHWS); HandLength(HALE); Foot Length(FOTE); Shoulders' width(SHWI); Hips Width(HIWI); Knee Diameter(KNDI); Stomach Perimeter(STPER); Thigh Perimeter(THPER); Cartilage Perimeter(CAPER); Subcutaneous Arm Tissue (SUART); Subcutaneous Stomach Tissue(SUSTI); Subcutaneous Back Tissue(SUBTI).

*Criterion Variable:*

## IMLOJU - Impetus Long Jumping

Data analysis was carried out using a specific computer software SPSS 16.0 Windows version. Through primary statistical analysis there were divided the results for each variable according to statistical methods: Minimum rate (Min), Maximum rate (Max), Arithmetic Average (Mean), Standard Deviation (Std. Dev.), The spread of curve asymmetry (Skewness) and Curve Spreading Sharpness (Kurtosis). T-test method was applied to distinguish differences between the genders, whereas for predictive variables for those criterions was

used the regressive analysis.

**RESULTS AND DISCUSSION**

In this research there were applied 14 morphological variables, Tables 1. and 2. present the primary statistical parameters' results of morphological variables set. Meanwhile there were calculated statistical methods: Minimum score (Min), Maximum score (Max), Arithmetic average (Mean), Standard Deviation (Std. Dev), the spread of curve asymmetry (Skewness) and Curve Spreading Sharpness (Kurtosis). Furthermore all variables will be elaborated where it is clearly presented that the spread of the rate is normal and homogenous. If we consider the outcomes, it is seen that boys represent higher rates in all findings, but in particular body height while sitting has minimum rate 79.00 cm and 91.00 cm is the maximum rate, while arithmetic average is 85.60 for girls, and boys present rates of 75.00 cm for minimum score, precisely 100.00 cm for maximum rate, whereas arithmetic average is 85.50 cm, and comparing the groups, it shows that girls have higher rate of 10 cm.

*Table 1. Primary statistic parameters as morphological predictors – girls*

Variables	Min.	Max.	Mean	Std. Dev.	Skewness	Kurtosis
BOWE	36.00	79.00	53.21	9.49	.521	.735
BOHE	144.00	168.00	159.51	5.37	-.908	1.795
BHWS	79.00	91.00	85.60	2.89	-.484	-.090
HALE	60.00	70.00	64.48	2.37	.444	.640
FOTE	82.00	102.00	92.63	4.47	-.472	.690
SHWI	22.00	28.00	24.70	1.54	.445	-.566
HIWI	19.00	26.50	21.81	1.55	.725	1.615
KNDI	7.00	10.00	8.15	.69	.299	.256
STPER	63.00	84.00	71.63	5.51	.784	-.302
HPER	40.00	50.00	44.20	2.78	.005	-.761
CAPER	28.50	37.00	32.50	2.00	.080	-.101
SUART	.80	2.70	1.77	.38	-.156	1.093
SUSTI	.60	7.00	2.36	1.12	2.186	9.446
SUBAT	.60	2.40	1.42	.43	.062	-.034

*Table 2. Primary statistic parameters as morphological predictors - boys*

Variables	Min.	Max.	Mean	Std. Dev.	Skewness	Kurtosis
OBWE	36.00	97.00	58.50	12.92	.785	1.345
BOHE	141.00	181.00	164.03	8.98	-.693	.942
BHWS	75.00	100.00	85.50	5.26	.360	.894
HALE	57.00	78.00	67.68	4.87	.147	-.201
FOTE	80.00	106.00	89.70	6.43	.743	.257
SHWI	26.00	30.00	28.66	1.08	-1.003	.786
HIWI	21.00	30.00	26.35	2.50	.043	-.867
KNDI	7.50	11.00	8.86	.79	.579	.535
STPER	63.00	98.00	76.30	8.99	.472	-.464
THPER	41.00	56.00	48.53	4.43	-.298	-1.065
CAPER	28.00	41.00	35.65	3.53	-.194	-.871
SUART	.60	3.00	1.44	.59	.714	.278
SUSTI	.80	4.40	2.00	.87	1.073	.973
SUBAT	.40	2.80	1.19	.67	1.281	.458

Knee diameter indicator has minimum rate of 7.00 cm, whereas maximum score is presented with rate of 10.00 cm, and the average score is 8.15 cm for girls. 7.50 cm is for minimum rate, 11.00 cm is the maximum rate and 8.86 cm is average rate results for boys. When comparing, 0.71cm is the highest rate in boys favor.

Presented rates proclaim the normal dispersion indicator of moving tests, impetus long jumping between boys and girls, and if we look at the spread of curve asymmetry (Skenwness) it is clearly seen that both tests present homogenous rate, respectively impetus long jumping for girls (IMLOJU .413) with positive asymmetry, whereas for boys is with negative asymmetry of (IMLOJU -.155).

#### ***Differences between genders in morphological set***

When studying Table 4. there was shown the statistic T-test method, with which we are going to prove the statistic differences between two groups in each morphological variable. With the dispersion of results between girls and boys it was reached to significant differences in probability extent .05 and .01 based on statistic method, which variables for shoulders` width, hips` width, thigh perimeter and cartilage perimeter have a validity extent of .000. The body weight indicator has an average rate of 53.21 kg for girls and 58.50 kg for boys. The difference in between is about 5.28 kg and probabilit-

ity .052. Body height has an average rate of 159.51 cm for girls and 164.03 cm for boys; the difference in between is 4.52 cm and validity extent is .010. Hand length variable has an average rate of 64.48 cm for girls and 67.68 cm for boys; the difference in between is 3.20 cm in an accurate degree .006. Meanwhile, leg length has an average of 92.63 cm for girls and 89.70 cm for boys; the difference is 2.93 cm in a degree of .036. Knee diameter average is about 8.15 cm for girls, whereas 8.86 cm for boys; the difference is .71 cm and validity extent is .001. Stomach perimeter has an average of 71.63 cm for girls and 76.30 cm for boys; the difference is 4.67 cm and an important rate of .023. Subcutaneous Arm Tissue parameter has an average of 1.77 mm for girls and 1.44 mm for boys; the difference in between is .34 mm and it is a probability level of .010. However, the last rate on the chart is the one marked with probability where subcutaneous back tissue with an average of 1.42 mm for girls and 1.19 mm for boys; the difference is about .23 mm which has a validity of .075.

Impetus long jumping variables has average rates of 208.00 for girls and 276.16 for boys; the difference between them is -68.16 on a probability extent of .000.

#### ***Regressive analysis interpretation***

*Impetus long jumping regressive variable in morphological set- girls*

*Table 3. Primary statistic parameters as moving criterion - girls and boys*

Variables	Min.	Max.	Mean	Std. Dev.	Skewness	Kurtosis
IMLOJU	130.00	290.00	208.00	40.33	.413	-.226
IMLOJU	180.00	360.00	276.16	37.57	-.155	.514

*Table 4. T-test among both genders in predictor variables*

Variables	Mean <sub>1</sub>	Mean <sub>2</sub>	Differ	Std. Dev.	Std. Error	t	Sig.
BOWE	53.21	58.50	-5.28	14.28	2.60	-2.02	.052
BOHE	159.51	164.03	-4.51	8.98	1.63	-2.75	.010
BHWS	85.60	85.50	.10	5.57	1.01	.09	.922
HALE	64.48	67.68	-3.20	5.95	1.08	-2.94	.006
FOTE	92.63	89.70	2.93	7.31	1.33	2.19	.036
SHWI	24.70	28.66	-3.96	1.98	.36	-10.93	.000
HIWI	21.81	26.35	-4.54	2.86	.52	-8.67	.000
KNDI	8.15	8.86	-.71	1.09	.20	-3.56	.001
STPER	71.63	76.30	-4.67	10.64	1.94	-2.40	.023
THPER	44.20	48.53	-4.33	5.92	1.08	-4.00	.000
CAPER	32.50	35.65	-3.15	4.32	.79	-3.98	.000
SUART	1.77	1.44	.34	.67	.12	2.74	.010
SUSTI	2.36	2.00	.32	1.39	.25	1.24	.224
SUBAT	1.42	1.19	.23	.68	.124	1.84	.075

*Table 5. T-test among both genders in criterion variable*

Variable	Mean <sub>1</sub>	Mean <sub>2</sub>	Differ.	Std. Dev.	Std. Error	t	Sig.
IMLOJU	208.00	276.16	-68.16	56.57591	10.32930	-6.599	.000

*Table 6. Vigorous long jumping- girls*

R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
.777	.604	.235	35.27069	.604	1.638	14	15	.177

  

	Sum of Squares	df	Mean Square	F	Sig.
Regression	28519.677	14	2037.120	1.638	.177
Residual	18660.323	15	1244.022		
Total	47180.000	29			

  

	B	Error	Beta	t	Sig.
(Constant)	823.831	515.173		1.599	.131
BOWE	2.851	2.145	.671	1.329	.204
BOHE	5.336	3.529	.711	1.512	.151
BHWS	-2.958	4.481	-.212	-.660	.519
HALE	-13.946	4.098	-.823	-3.403	.004
FOTE	.120	3.600	.013	.033	.974
SHWI	-12.031	7.356	-.459	-1.636	.123
HIWI	17.216	7.036	.662	2.447	.027
KNDI	-.346	15.339	-.006	-.023	.982
STPER	-3.217	2.994	-.440	-1.075	.300
THPER	1.580	3.921	.109	.403	.693
CAPER	-9.176	5.764	-.455	-1.592	.132
SUART	-43.906	35.823	-.421	-1.226	.239
SUSTI	5.814	12.332	.163	.471	.644
SUBAT	-21.006	30.395	-.229	-.691	.500

*Table 7. Impetus long jumping - boys*

R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
.630	.397	-.166	40.57281	.397	.705	14	15	.741

  

	Sum of Squares	df	Mean Square	F	Sig.
Regression	16241.878	14	1160.134	.705	.741
Residual	24692.288	15	1646.153		
Total	40934.167	29			

  

	B	Error	Beta	t	Sig.
(Constant)	408.148	314.337		1.298	.214
BOWE	1.060	1.493	.364	.710	.489
BOHE	-1.607	2.208	-.384	-.728	.478
BHWS	3.581	3.188	.502	1.123	.279
HALE	1.115	2.780	.145	.401	.694
FOTE	.854	2.098	.146	.407	.690
SHWI	-5.291	13.860	-.153	-.382	.708
HIWI	4.094	5.166	.273	.792	.440
KNDI	-6.469	21.537	-.137	-.300	.768
STPER	.851	2.251	.204	.378	.711
THPER	-2.571	4.601	-.304	-.559	.585
CAPER	-6.001	6.093	-.565	-.985	.340
SUART	29.066	50.745	.459	.573	.575
SUSTI	-14.984	38.090	-.348	-.393	.700
SUBAT	-20.841	35.883	-.376	-.581	.570

In Table 6. there were given the regressive analysis results where was predicted impetus long jumping. According to multiple correlation rate ( $R=.60$ ), it can be explained further that 23% of common variability of predictive system and criterion variable is very low in importance level ( $P=.17$ ). The rest percentage, 77% is highly influenced by unknown factors which were excluded from this research. If we analyze the influence of predictive variables we can see that hand length and thigh length indicators have an extremely important statistic influence in predicting results of the criterion variable. According to partial regression coefficient, hand length had an influence, ( $Beta=-.823$ ) that is important at .004 level, throughout this, it is seen that impetus long jumping has a negative influence. Meanwhile, thigh width, ( $Beta=.662$ ) is important at .027 level, throughout this, it is seen that impetus long jumping has a positive influence. Furthermore, according to regressive analysis we can conclude that morphological indicators do not have a highlighted influence in predicting the results in impetus long jumping.

*Impetus long jumping regressive variable in morphological set- boys*

In Table 7. the multiple coefficient is very low and statistically insignificant. We can add that morphological variables' system does not have influence in predicting the impetus long jumping. Therefore, it is logical that variables' influence separately will be omitted.

## CONCLUSION

In this research there were included 60 participants (students) aged 14 that attend a particular PE program. In order to test the reliability we have applied 15 variables, 14 of them as predictable morphological indicators and 1 as moving criterion. According to basic statistical parameters there were recorded normal rates, which are homogenous in between. In order to prove the significance between measured genders there was used T-test method, a method that proved the significance between these groups in morphological and moving variables. With the division of these results among boys and girls we have come to important differences in probability level .05 and .01. Whereas through regressive analysis there was studied the morphological variables' expanse as predictor and impetus long jumping as criterion. Based on the regression partial coefficients, that hand length influence, ( $Beta=-.823$ ) is highly important in .004 level, based on this, it is seen that impetus long jump has negative impact. Whereas, parameters such as, thigh width, ( $Beta=.662$ ) is highly important at level .027, according to this it is shown that impetus long

jumping has a positive effect at girls' group. As presented previously, morphological indicators do not seem to have an important influence in predicting impetus long jumping results.

## REFERENCES

- Branković, N., Pirs, D., Stojiljković, D., Petković, M., & Radičević, J. (2011). The canonican relations between morphological characteristics and tests used to evaluate explosive strengh among elementary school children. *Research in Kinesiology*, 39(1), 79-83.
- Demura, S., Sato, S., & Noguchy, T. (2005). Prediction of segmental percent fat using anthropometric variables. *Journal of Sports Medicine an Physical Fitness*, 45(4), 518-523.
- Kurelić, N., Momirović, K., Stojanović, M., Šturm, J., Radojević, Đ., & Višćić-Štalec, N. (1975). Struktura i razvoj morfoloških i motoričkih dimenzija omladine. [Structure and development morphological and motoric dimensions of youth. In Serbian.] Beograd: Institut za naučna istraživanja Fakulteta za fizičko vaspitanje Univerziteta u Beogradu.
- Petruševska-Aleksovska, L. (2012). Relations of some anthropometric characteristics and motor abilities with a long jump. *Activities in Physical Education and Sport*, 2(2), 2013-2015.
- Ivanović, M. & Ivanović, U. (2011). Anthropometric and motor determinants of endurance running in pre-adolescent age. *Acta Kinesiologica*, 5(1), 34-39.
- Iseni, A. (2013). The influence of some motor skilss and anthropometric characteristics in successful sprint running at 200 meters at students of 16 years old., *Activities in Physical Education and Sport* 3(1), 47-50.
- Tešanović, G., Mihajlović, I. Bošnjak, G. & Dragosavljević, P. (2010). Relations between the body mass index and the anthropometric dimensions and the results achieved in shot. *Acta Kinesiologica*, 4(2), 78-82.
- Tešanović, G. (2009). *Relacije nekih antropomotoričkih sposobnosti sa postignutim rezultatom u bacanju vortex-a*. [Relations between some antropomotoric abilities with the results achieved in shot a vortex. In Serbian.] (Unpublished Master's thesis, University of Banja Luka) Banja Luka: Fakultet fizičkog vaspitanja i sporta.
- Tončev, I. (1991). *Atletika - tehnika i obučavanje*. [Athletics - techniques and training. In Serbian.] Novi Sad: Fakučtet fizičke kulture.
- Šnajder, V. (1990). Uticaj specifičnih i bazičnih motoričkih variabli na rezultate sprinta kod učenica u atletskoj školi. [The influence of specific and basic motor variables on the results of the sprint with girls in school athletics. In Croatian.] *Kineziologija*, 22(1-2), 45-48.
- Smajić, M. (1980). Povezanost nekih antropometrijskih i psihomotričkih varijabli s rezultatima u atletskom des-teoboju. [Correlation between some anthropometric and psychomotoric variables and results of athletic decathlon. In Serbian.] *Fizčka Kultura* 2(1), 80-87.

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