

PROFESSIONAL ARTICLE**Dejan Gojković¹, Dušan Mićović²**¹Faculty Physical Education and Sport, East Sarajevo, Serbian Republic, Bosnia and Herzegovina².SOS „Kosovo peony“ special school Kosovska Mitrovica**UDK: 796:572.087-053.5****DOI: 10.7251/SIZ0217029G****ANTHROPOLOGICAL DIMENSIONS QUANTITATIVE CHANGES UNDER THE INFLUENCE OF MORPHOLOGICAL ABILITIES IN ATHLETES****Abstract**

Morphological anthropometry is important for selection of candidates for a particular sport or discipline, monitoring and evaluation of the training process, objective evaluation of the overall development and control of the nutritional status of children athletes and fitness enthusiasts.

The sample of respondents was 54 secondary schools in Banja Luka, aged 15 years covered by the regular physical education and additional trainer work for the development of strength and agility within the Sports Association for the Physical Education School. All subjects involved in the experiment were healthy as determined by a medical examination before and after the experiment.

The sample of variables for morphological capability makes the dimensions: circular dimensions of the skeleton and the body mass as follows: average thorax in cm, the thigh stretched legs in cm, the maximum extent of the leg in cm, mass of the object in gr. Subcutaneously adipose tissue and that the thickness of abdominal skin folds in mm, the thickness of thigh skin folds in mm, the thickness of the skin fold of the lower leg in mm. Suggested model sample of the anthropometric measures for the assessment of the morphological characteristics is applied according to the instructions of the International biological program (IBP). Results of canonical discriminative features indicate that in the final compared to the initial measurement with the experimental group there was a statistically significant change ability. Set morphological hypotheses were confirmed.

Key words: Anthropology, athletes, students, morphological skills

INTRODUCTION

It is believed that latent structure of morphological characteristics consists of four dimensions. (Kurelic.2005) .Factor longitudinal dimension of the skeleton is responsible for the growth of bone in the body length. In during growth and development of certain parts of the body follow different curve, reaches its maximum at the different points .Factor transversal dimension of skeleton responsible for bone growth in width. Factor circular dimensions and mass of the body responsible for the overall weight and volume of the body and is defined predominantly weight. Factor subcutaneous adipose tissue shows the total amount of fat in the body.

It is very important to have information on the structure and development of morphological dimension because of the possibility transformation. Maximum transformation is possible in subcutaneous adipose tissue, followed by a body volume is very low or negligible at the longitudinal and transverse dimensions of the skeleton.

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METHOD

The sample of respondents was 54 secondary schools in Banja Luka, aged 15 years covered by the regular physical education and additional trainer work for the development of strength and agility within the sports association for physical culture school. All respondents involved in the experiment were healthy as determined by a medical examination before and after the experiment.

The aim of the research was that in addition to the regular physical education classes, and determine the impact of motor power and agility to additional classes to the abilities of morphological changes at subject. Set the following tasks: establish initial state morphological skills-students, to determine the final status of morphological abilities of students and identify differences between initial and final state of the morphologic and functional abilities pupils. Set the following hypotheses: there are no statistically significant change in the results of morphological ability to final measurement in relation to the state of the respondents initial. The sample of variables for morphological capability makes the dimensions: circular dimensions of the skeleton and the body mass as follows: average thorax in cm, the thigh stretched legs in cm, the maximum extent of the leg in the body weight in cm. Subcutaneously adipose tissue and that the thickness of the leather folds of abdomen in mm, the thickness of thigh skin folds in mm, the thickness of the skin fold of the lower leg in mm. The proposed model sample of the anthropometric measures for the assessment of the morphological characteristics is applied according to the instructions of the International biological program (IBP).

RESULTS AND DISCUSSION

Basic statistical parameters of the respondents to assess the morphological characteristics of the initial measurement

Table 1

	N	Mean	Min	Max	SD	Skewn	Kurtos
AOGKŠ	54	82.14	76.00	87.00	1.35	0.588	-1.553
AOBUT	54	54.25	48.00	59.00	4.66	0.352	-2.023
AOPTK	54	34.57	29.00	38.00	3.42	0.389	1.814
AMAST	54	58.62	50.00	64.64	6.49	0.258	1.521
AKNTR	54	16.76	10.00	19.00	4.98	0.425	-1.213
AKNBU	54	13.14	9.00	16.00	5.22	0.489	-1.257
AKNPK	54	10.84	7.00	14.00	4.96	0.369	0.648

Legend: AOGKŠ-average thorax, aobut the thigh-stretched leg, AOPTK-maximum volume of the leg, the weight of the body-AMAST, Akntr-skinfold thickness of the abdomen, thickness ACNB-thigh skin folds, AKNPK-skinfold thickness of the lower leg

Results shown in Table 1 in patients at the initial measure in morphologic characteristics, the initial measurement point that there is no statistical difference between the results of significance subjects than normal distribution. Results tests used to assess the morphological characteristics indicate that the distribution is positive. To is confirmed by the asymmetry of distribution (skjunis) which does not exceed 1:00 which means that tests were not heavy (up to +1.00) and no light (up to -1.00), but correspond to subject population and results below are one. The homogeneity (kurtosis) indicates that there is present that is present as good sensitivity were obtained values below 2.75. The results of morphological characteristics do not depart from the results of similar studies of proven by us in this population of subjects, there by enabling the application of the processing method of multivariate results in this reaserch. General results in the population from which the sample is derived of these subjects is the time one surf on.

Table 2. Basic statistical parameters of the respondents to assess the morphological characteristics of the final measurement

	N	Mean	Min	Max	SD	Skewn	Kurtos
AOGKŠ	54	86.75	77.00	89.00	1.48	0.644	-0.300
AOBUT	54	57.46	50.00	60.00	1.65	0.162	0.055
AOPTK	54	38.15	30.00	40.00	6.40	0.263	0.636
AMAST	54	60.31	52.00	65.00	0.15	0.251	0.903
AKNTR	54	13.64	9.00	17.00	8.52	0.773	1.802
AKNBU	54	10.52	8.00	15.00	6.89	0.345	0.544
AKNPK	54	8.11	6.00	13.00	4.45	0.855	0.148

Legend: AOGKŠ-average thorax, aobut the thigh-stretched leg, AOPTK-maximum volume of the leg, the weight of the body-AMAST, Akntr-skinfold thickness of the abdomen, thickness ACNB-thigh skin folds, AKNPK-skinfold thickness of the lower leg

The obtained results in the Table 2 in subjects in the morphologic characteristics, the final measurements indicate that no statistically significant difference between the results from the normal patients distribution. Results tests which evaluated morphological characteristics of the patients indicate that the distribution positive. To is confirmed by the asymmetry of distribution (skjunis) which do not exceeds 1.00 a this means that tests were not heavy (up to +1.00), no light (up to -1.00), but correspond to the population of research and below are one. The homogeneity result (kurosis) indicates that there is present a good sensitivity (discriminative tests), since the obtained values below 2.75. The results of morphological characteristics do not differ from the results of similar studies verified by us on this population of patients.

Analysis of the difference between the initial and final measurements of subjects examined by t-test

Table 3. Significance mean difference of the initial and final measurements of the morphological characteristics of the respondents

tests	Mean(i)	Mean(f)	t-value	P
AOGKŠ	82.14	86.75	2.73	.018
AOBUT	54.25	57.46	3.09	.008
AOPTK	34.57	38.15	3.83	.005
AMAST	58.62	60.31	2.76	.017
AKNTR	16.76	13.64	2.73	.018
AKNBU	13.14	10.52	3.48	.001
AKNPK	10.84	8.11	2.69	.022

Table 3 contains the results of the t - test morphological characteristics between the initial and final measure. After obtained result it is concluded that there is a statistically significant difference between the volume of the thorax (AOGKŠ .018) of the volume of the lower leg (AOPTK .005), the mass of the body (AMAST .017) abdominal skinfold (AKTNR .018), skin folds of the thighs (ACNB .001), and the leg skin weapons (AKNPK .022).

Differences between initial and final state of the morphological characteristics of the respondents abilities.

Table 4. Significance isolated discriminant function of the morphological characteristics of the respondents

Disk.Funkc.	Eigenvalue	Cannonicl R	Wilks Lambda	Chi-Sqr.	df	P-Level
1	1.922	0.65	.421	56.89	7	.035

We have obtained one discriminant function medium of high intensity (CR = 65%), which indicates in which the correlated set of data upon which analysis is performed discriminative obtained results. Results discriminant strength anthropological measures of the given test-Wilks Lambda .421, indicating that the difference between the initial and final measurement in space morphological characteristics important because the size Hi square test has a high value.

Table 5. The factor structure isolated discriminant function

Antropomere	Root 1
AKNBU	0.525
AOBUT	0.499
AOPTK	-0.489
AMAST	-0.356
AKNTR	0.125
AOGKŠ	0.100
AKNPT	0.056

Legend: AOGKŠ-average thorax, aobut the thigh-stretched leg, AOPTK-maximum volume of the leg, the weight of the body-AMAST, Akntr-skinfold thickness of the abdomen, thickness ACNB-thigh skin folds, AKNPK-skinfold thickness of the lower leg

Table 5 presents the structure of the discriminant measure antropological function is participation in the formation of the morphological characteristics of the discriminant functions of significant .Show centroids represent the arithmetic mean of the result of the initial and final measure.In order to verify the significance of differences between the initial and final measurements of subjects, and the efficiency of program contents of regular classes education and experimental model motor power and agility measured seven anthropometric measures that are supposed to be good predictors space. Show study results indicate that the largest contribution to the discriminant function with anthropometric measures, skin fold thighs (AKNB 0.525) and the thigh (aobut 0499).

Table 5. Centroid measurements

Measure	Root 1
Initial	1.856
final	-1.856

Results in Table 5 represent the discriminant function of the centroid of all on the basis of anthropometric dimensions equal to 1.856 and - the measurement of the centroid 1.856. Significance shown which was tested the significance of the discriminant function indicates that their distance (a statistically significant discrimination).

Table 6.

Measure	Initial	final	Total
Initial	45	9	54
Final	11	43	54
Initial	83,33%	16,67%	100%
final	20,38%	79,62%	100%

Separation of the groups shown in table 6 as percentiles indicates that the separation of committed (discrimination) explains results from 81.48% (mean percent of the groups) of the canonical correlation coefficient which is CR = 65%.

The results of discriminant analysis of morphological characteristics in the final compared to the initial measurement indicates that under the influence of programs of regular physical

education teaching and experimental models of motor strength and agility there was a statistically significant change in morphological space subjects.

CONCLUSION

The sample of respondents was 54 secondary schools in Banja Luka, aged 15 years covered by the regular physical education and additional trainer work for the development of strength and agility within the Sports Association for the Physical Education School.

All subjects involved in the experiment were healthy as determined by a medical examination before and after the experiment.

The aim of the research was that in addition to the regular physical education classes, and determine the influence of morphological abilities and strength and agility to additional classes on morphological changes in abilities of respondents.

Set the following tasks: establish initial state morphological skills-students, to determine the final status of morphological abilities of students and to determine the changes between the initial and final state in the space of morphological abilities of students.

Set the following hypothesis: there are significant changes in the results of morphological abilities of the final measurement in relation to initial state subjects.

Were determined following conclusions:

Results of canonical discriminative features indicate that in the final compared to the initial measurement with the experimental group there was a statistically significant change ability. Set morphological hypotheses were confirmed.

Using T test and canonical discriminant analysis has been shown that the subjects students involved in additional training operation in the sports association for physical culture in the school and regular physical education a statistically significant difference in the morphological abilities of the students included merely PE classes. Past experiences suggest and confirm that school physical education does not reach a level that corresponds to the capabilities, needs and abilities of students and suggests that school physical education insufficiently affect the physical abilities of students, and that the results are not satisfactory. One of the important factors bkoji characterized by modern technology of teaching physical education and training is certainly the fact that the optimal level of morphological abilities of school children covered by a regular physical education can not develop and maintain a proper relative anthropological characteristics.

Results of morphological abilities of respondents have practical value for:

- Quality methodical design training work on the development of morphological abilities
- selection and guidance of gifted children for a particular sport or discipline
- monitoring and evaluation of the training process of morphological abilities of
- planning work program for the development of strength and agility and ability of the individual characteristics of the respondents.

The research results can serve as a basis for future research that would include other anthropological characteristics and therefore it would be received and harder information about the transformation process antropoloških morphological characteristics under the influence and abilities of agility in young athletes.

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