



Clarifying Differences in the Manifestation of Young Men's Motor Fitness Components in the Absence of Compulsory Physical Activity

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Abstract

Background. The current trend in the modernization of university physical education involves the development of a personal educational trajectory for each student.

Objectives. The study aimed to determine the peculiarities in the development of young male students' motor fitness components, taking into consideration their somatotypes and the absence of compulsory physical activity at the university.

Materials and methods. The study involved 39 young men aged 17.6 ± 0.5 years who had just started studying at the university, belonged to different somatotypes and had no restrictions in the use of different physical activity parameters. The somatotype was determined using the modified Stefko-Ostrovsky method. The 11 main components of motor fitness were examined, using motor tests recommended by researchers, appropriate testing methods and instruments. Each test met the requirements of reliability, informativeness and allowed to evaluate speed, frequency of movements, ability to balance, power, explosive strength of arms and legs, abdominal muscle strength, arm strength, flexibility, agility and aerobic endurance. The parameters of these components were determined in each available somatotype, and each parameter was compared with different somatotypes. Testing was conducted at the beginning (January) and at the end (May-June) of the academic semester, but during one academic year.

Results. At the beginning and at the end of the study, it was noted that there were differences in the development of motor fitness components among the various somatotypes when compared with each other (p at the level from 0.05 to 0.000). The volumes and conditions of physical activity realization used during the study contributed to the change of young men's results in some components. However, these alterations varied across different somatotypes.

Conclusions. The information about peculiarities of the development of motor fitness components among individuals with different somatotypes is important for increasing the efficiency of university physical education based on the personalization of content and differentiation of normative bases of this process.

Keywords: motor fitness, somatotypes, personalization, university physical education, physical activity, COVID-19.

Introduction

A complex of reasons of objective, but mostly subjective nature determines the low efficiency of physical education

in higher education institutions (hereinafter – university) despite its effectiveness and high potential in successfully solving a wide variety of tasks (Torres, Peneida, & Torres, 2022; Banah, & Iedynak, 2021; James et al., 2023). Due to this situation, the problem of modernizing physical education at the university continues to be relevant. Some important reasons for the need for this are largely due to the air raids characteristic of today as a result of the war with Russia, the

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consequences of quarantines during the Covid-19 epidemic (Piestrzyński et al., 2021; Limone et al., 2022; Byshevets et al., 2024). This has led to organizing the educational process at Ukrainian universities in the form of a mixed one, i.e., which involves traditional and distance learning (Dovgan, 2020; Andrieieva et al., 2023–2024).

Given the current situation, many domestic and foreign researchers emphasize the prospects and the need to continue scientific research in the personalization (individualization, differentiation) of university physical education. This will help to intensify the activities of teachers and students in the implementation of independent classes in practice by the latter in extracurricular time, as well as improve the quality of teachers' advisory services and their activities to strengthen the motivation of students to study in sports sections at the university, and other activities in extracurricular time (Coulter et al., 2016; Frąckiewicz, 2023). Some researchers (Banakh et al., 2023) emphasize the prospects of a methodological approach to personalization (individualization) of university physical education, based on a specific «educational route» for each student. However, this approach assumes the presence of a predictive and effective marker (except for gender), i.e., based on which homogeneous samples will be formed with the subsequent determination of the content of their physical activity program with optimal load parameters for each student (Wilmor et al., 2022).

It has been found that at the present stage, one of the most promising in terms of practical use is a marker-trait of a person as a somatotype (Cinarli, & Kafkas, 2019; Campa, & Greco, 2022). In this regard, it is important to know about the peculiarities of manifestation and changes in various characteristics of representatives of existing somatotypes over a certain age period. The main reason for this is the importance of such data for the formation of effective physical activity programs, the focus of which is most appropriate for representatives of a particular somatotype due to its genetically determined capabilities and abilities, and the load parameters are adequate to the current capabilities of each (Iedynak et al., 2021).

However, so far, the data in this area are insufficient to successfully solve this problem. In addition, there are few studies on the peculiarities of manifestation, which mark the components of functional and motor fitness of with different somatotypes, primarily taking into account the influence of such an external factor as the absence or minimization of physical activity at the university. All of the above has led to the conduct of the study on the chosen topic.

Materials and Methods

Study Participants

The study involved 39, each aged 17.6 ± 0.5 years. They belonged to different somatotypes, but none of them had reservations about using different parameters of physical activity. The distribution of these by somatotype was as follows: 8 belonged to the asthenic somatotype (A-type), 12 to the thoracic somatotype (T-type), 10 to the muscular somatotype (M-type), and 9 to the digestive somatotype (D-type).

Variables and Criterion Measures

Eleven (11) essential fitness indicators were the focus of the study. The motor tests recommended by the researchers were used (Tab. 1).

Table 1. Variables and criterion measures

Variables	Test items	Unit of measure
Agility	4 × 9 m SR	Second (s)
Leg balance	SLB/ Flamingo Balance test	Number of attempts (n)
Speed of individual movement	20 m S	Second (s)
Speed of limb movement	10 s PTT	Number (n)
Power (legs) (arms)	SBJ SMBT	Centimeter (cm) Meter (m)
Arm muscle strength	max. FE	Number (n)
Abdominal muscle strength	60 s. SU	Number (n)
Back muscle strength	BE/Static dynamometry	Kilogram (kg)
Flexibility	SAR	Centimeter (cm)
Cardiovascular endurance	Cooper/12 minutes run	Meter (m)

*SR= Shuttle Run, SLB= single leg balance, S= sprint, PTT= Plate tapping test, SBJ= Standing Broad Jump, SMBT = seated medicine ball throw, FE= Flexion-extension, SU= Sit-up, BE= Back extension, SAR= Sit-and-Reach

Each of these tests is well known to researchers, is widely used in physical activity practice, and meets the requirements of reliability and informativeness (Bhagi et al., 2024; Eurofit Fitness Testing Battery, 2025; Fitness tests, 2025).

Test Procedure

SR test was conducted in a gym. Two lines were located on the running course at a distance of 9 meters from each other. Each line had one cone that the young man had to run around. One of the lines was marked as the start and finish. Here, each young man took a high start position, and on the coach's command, he started running at maximum speed to the cone opposite. After that, the young man ran around this cone and started moving in the opposite direction to another cone. In total, he had to overcome 4 segments. The result was the time to overcome these segments, for which the young man was given one attempt. The SLB test was performed according to the recommendations of the Eurofit Fitness Testing Battery (2025). The S-test was performed on an athletic treadmill, with a total distance of 30 meters. There were three lines on the treadmill: from the first line (start) to the second (intermediate line) the distance was 10 meters, and from the second line to the third (finish) – 20 meters. Before starting to run, the young man on the start line took a high start position. He started to move only with the permission of the coach (shot of the starting pistol) and covered the distance using a straight run at maximum speed. The test was conducted twice, and the best result was taken into account with an accuracy of 0.1 seconds. Determining the time it took to cover the 20-meter distance had its peculiarity. The stopwatch was turned on when the young man crossed the second line and turned off when he crossed the third line, i.e. the finish line. At the same time, the distance of 10 meters (between the first and second lines) was intended to allow

the young man to gain maximum speed and to eliminate the influence on the result of the time spent by the young man on the reaction he showed after the coach's permission to start moving. The PTT test was used to study the state of development of young men' hand speed. The test involved a young man performing the maximum possible number of taps with a pencil on the surface of a clean sheet of paper on the table in 10 seconds. After completing the task, the number of dots that the young man managed to put on the paper was counted. The organization of the test included the following: the table was adjustable, it was adjusted so that the young man could sit comfortably at it and place his hand with a pencil on it; during the test, the hand holding the pencil could not be taken off the table surface; two attempts were given, the best result was taken into account. SBJ-test was used to assess the strength and power of the lower extremities. The young man stood with his heels on a line, then jumped horizontally as far as possible without specific instructions on leg or arm movements. After landing with both feet together, the jump distance was measured from the starting line to the heel closest to the start. The SMBT test was used to assess upper limb strength and power. The young man sat on the line so that it and his back formed the same plane, and his feet were positioned in the throwing sector. His arms were placed behind his head with a one-kilogram ball. After the coach's permission, the young man threw the ball as far as possible with both hands without specific instructions on such movements. The FE test allowed us to evaluate the strength endurance of the arm muscles in a dynamic mode of operation. The young man performed flexion and extension of the arms in a handstand on the floor. The arms were shoulder-width apart, not bent at the elbow joints, the legs touched each other, not bent at the knee joints. The movement is scored when the young man touches the floor with his chest while bending his arms and then returns to the starting position. The maximum number of movements was evaluated. The SU-test also allowed us to evaluate strength endurance, but only of the abdominal muscles in a dynamic mode of operation. The young man begins by lying on his back with his knees bent at a 90-degree angle. The young man's hands should be placed behind his head and his elbows extended straight ahead. The number of repetitions of the movement within one minute is estimated. BE-test allowed us to assess the state of development of isometric strength of the musculus erector spinae. The test involves the use of a special device, we used PSH-1000N and took into account the recommendations of researchers (Yu et al., 2023). The result of the SAR test was used to determine the flexibility of the young man. This test was performed in accordance with the recommendations of the Eurofit Fitness Testing Battery (2025). The Cooper test was used to assess the aerobic capacity and cardiovascular system of a young man.

Study Organization

Somatotypes were diagnosed at the beginning of the experiment. The use of this scheme was due to the following reasons: the main characteristics of the scheme are very similar to the Heath-Carter scheme, which is most often used by researchers from Europe and the United States (Carter, & Heath, 1990; Bertuccioli et al., 2022; Campa, & Greco, 2022). The modified methodology of the Shtefko-Ostrovsky scheme

makes it extremely possible to establish a certain trend, especially manifestations and changes in motor fitness in comparison with the data of other researchers (Sands, 2012; Iedynak et al., 2021; Silventoinen et al., 2021). Testing was conducted at the beginning (January) and end (May-June) of the academic semester during one academic year. The results were compared with each other first in each somatotype, then in different somatotypes. The increase or decrease in the parameters of a certain component of motor fitness or its manifestation at the previously achieved level was determined.

The study was planned and implemented by the principles of bioethics set out by the World Medical Association (WMA-2013).

Statistical Analysis

All statistical analyses were performed using SPSS Version 21. For each indicator of motor fitness, we determined: arithmetic mean (M), standard deviation (SD), minimum (Min) and maximum (Max) values. To check the normality of the data in each sample of, the Kolmogorov-Smirnov Test (KS) was conducted; it confirmed that the data corresponded to a normal distribution. This allowed us to use the t-test for related and unrelated samples when comparing two means (significance levels of 0.05, 0.01, 0.001). The F-test was also used to determine the relative variance when comparing two means in independent samples (Weir & Vincent, 2020).

Results

Before studying the empirical data, we analyzed them from the point of view of compliance with the normal distribution of values of each physiological characteristic in the studied samples. The K-S Test was used, and the results in all cases revealed a normal distribution of values (Tab. 2).

When comparing the data of young men with different somatotypes, the existence of differences in the achieved parameters was revealed. Thus, the largest number of statistically significant differences was in the pair of samples of D- and T- types, namely 10 out of all 11 components of motor fitness (Tab. 3).

The D-type had better results in SMBT and BE, and the T-type had better results in all other components.

In a pair of samples of D- and M-types, the parameters of 9 components differed, but only in SAR did D-type young men have an advantage.

In A- and D-types a statistically significant difference of parameters was found in 7 of all 11 components of motor fitness. But in 2 components (SMBT and BE) the D-type was marked by the best parameters, while in the other (S, SBJ, FE, SR, SLB) – A-type.

Continuing to compare the achievements of young men with A-type and representatives of other somatotypes, it was found that they and with M-type differed in the parameters of 8 components. Of these, young men with A-type had better results in Cooper test and SLB, and young men with M-type - in S, SBJ, SMBT, BE, FE and SU.

The results of the A- and T-types differed in 7 indicators, but the former had the best SLB parameters, the latter – S, SBJ, SMBT, BE, FE and SR.

As for the T- and M-types, the smallest number of results were found differed by a statistically significant amount when compared; there were 5 out of all 11 indicators.

Table 2. Results of young men with different somatotypes at the beginning of the study

N	Name of the test	M1	SD	Min	Max	K-S, p
A-type (n=8)						
1	S	3.28	0.24	3.00	3.60	>0.20
2	PTT	68.13	4.19	60.00	73.00	>0.20
3	SBJ	190.63	8.03	175.00	200.00	>0.20
4	SMBT	4.96	0.49	4.20	5.60	>0.20
5	BE	71.75	8.48	60.00	81.00	>0.10
6	FE	17.25	4.59	10.00	24.00	>0.20
7	SU	38.13	6.17	30.00	47.00	>0.20
8	SAR	6.23	2.23	3.20	8.90	>0.20
9	SR	10.93	0.66	10.10	11.80	>0.20
10	Cooper-test	2362.50	188.05	2150.00	2680.00	>0.20
11	SLB	4.25	2.05	2.00	8.00	>0.20
T-type (n=12)						
1	S	2.90	0.31	2.50	3.40	>0.20
2	PTT	71.08	4.06	64.00	79.00	>0.20
3	SBJ	217.08	9.53	195.00	230.00	>0.20
4	SMBT	6.18	0.54	5.40	7.20	>0.20
5	BE	86.46	9.10	72.00	104.00	>0.20
6	FE	23.42	5.60	15.00	35.00	>0.20
7	SU	41.75	5.82	29.00	50.00	>0.10
8	SAR	7.88	2.78	4.40	12.50	>0.20
9	SR	10.11	0.39	9.50	10.80	>0.20
10	Cooper-test	2274.17	238.84	1920.00	2550.00	>0.20
11	SLB	6.67	2.74	3.00	11.00	>0.20
M-type (n=10)						
1	S	3.00	0.27	2.60	3.40	>0.20
2	PTT	65.70	4.67	57.00	71.00	>0.20
3	SBJ	210.30	8.41	197.00	224.00	>0.20
4	SMBT	6.970	0.43	6.30	7.50	>0.20
5	BE	96.50	9.31	83.00	115.00	>0.20
6	FE	30.10	6.51	20.00	42.00	>0.20
7	SU	48.30	6.13	40.00	59.00	>0.20
8	SAR	6.98	2.18	3.10	9.40	>0.20
9	SR	10.01	0.41	9.40	10.70	>0.20
10	Cooper-test	2144.00	153.13	1950.00	2350.00	>0.20
11	SLB	7.10	2.76	3.00	10.00	>0.20
D-type (n=9)						
1	S	3.61	0.26	3.30	4.10	>0.20
2	PTT	60.30	5.43	51.00	68.00	>0.20
3	SBJ	171.89	9.06	156.00	183.00	>0.20
4	SMBT	7.00	0.63	6.00	7.90	>0.20
5	BE	98.56	6.69	91.00	110.00	>0.10
6	FE	10.78	3.31	5.00	15.00	>0.20
7	SU	27.11	5.33	18.00	34.00	>0.20
8	SAR	10.33	2.92	7.00	15.00	>0.20
9	SR	11.22	0.40	10.70	11.80	>0.20
10	Cooper-test	1785.56	150.01	1500.00	1950.00	>0.20
11	SLB	9.89	1.96	6.00	12.00	>0.20

Note: SR = Shuttle Run, SLB = single leg balance, S = sprint, PTT = Plate tapping test, SBJ = Standing Broad Jump, SMBT = seated medicine ball throw, FE = Flexion-extension, SU = Sit-up, BE = Back extension, SAR = Sit-and-Reach

The repeated study, which took place at the end of the academic year, revealed certain features of changes in the parameters of the studied components of motor fitness. One of them is a change in parameters of only certain components in each somatotype. However, in young men with D-type changes were not statistically significant, that is they showed only a certain tendency (Tab. 4).

In young men with A-, T- and M- types, only SU parameters showed a statistically significant change. However, the first ones indicated a deterioration in the development of this component of motor fitness.

The changes detected at the end of the school year indicated an increase in the discrepancies between the parameters of young men with a certain somatotype. Thus, in A- and T-types, the number of indicators with significant differences in parameters increased from 7 at the beginning to 9 at the end of the study (Tab. 5).

Comparison of A- and M-types revealed that the results of 8 of all 11 components differed, i.e., at the beginning of the study. But if at the beginning the state of development of speed qualities differed, then at the end it disappeared: the result of young men with A-type was 3.21 ± 0.20 seconds, young men with M-type – 2.9 ± 0.31 ($t = 0.334$; $p > 0.05$). There was a difference in the development of flexibility, and at the beginning of the study, there was none: in A-type the result was 6.38 ± 1.9 centimeters, in M-type – 7.4 ± 2.79 centimeters ($t = 3.524$; $p < 0.01$); the latter result was better. In the other 7 components, the pattern of discrepancy remained the same as at the beginning of the study.

In the pair of samples D-A, there was a significant increase (from 7 at the beginning to 10 at the end of the study) in the number of components with different results. PTT, SU, SAR, and Cooper-test were added to the components identified at the beginning of the study. The results in all but SAR were better in the A-type; in young men with D-type, SAR parameters were at the level of 11.0 ± 3.67 centimeters, in young men with A-type – only 6.38 ± 1.9 centimeters ($t = -3.193$; $p < 0.01$).

Comparison of results in D- and T-types at the end of the study showed that the number of components of motor fitness, the results of which differed from each other, was 10 out of all 11.

In the pair of samples D-M, at the end of the study, the number of components with statistically significant differences in parameters decreased from 9 to 7. These two components were PTT and SLB because the results of the young men of both samples in each component were almost identical. In the other 7 components, the peculiarity of the divergence of parameters was similar to that found at the beginning of the study.

Comparison of results in T- and M-types at the end of the research showed that the number of components of motor fitness, the results of which differed from each other, was the same as established at the beginning of the research, namely 5 out of all 11. But the composition of these components partially differed.

Discussion

One of the important tasks of modern physical education is to identify the peculiarities in the development of students' motor fitness components, considering their somatotypes and the influence of such an external factor as the lack of compulsory physical activity at the university (Coulter et al.,

Table 3. Differences in results of young men with different somatotypes at the beginning of the study

Result (points)	The name of the component										
	1	2	3	4	5	6	7	8	9	10	11
A - T											
t	2.870	-1.577	-6.457	-5.108	-3.477	-2.583	-1.333	-1.407	3.493	0.878	-2.121
F	2.000	1.000	1.000	1.000	1.000	1.000	1.000	2.000	3.000	2.000	2.000
p	0.010	0.132	0.000	0.000	0.003	0.019	0.199	0.176	0.003	0.392	0.048
A - M											
t	2.870	1.145	-5.030	-9.263	-7.278	3.365	3.951	-3.229	-1.138	7.033	-2.474
F	1.300	1.200	1.100	1.300	1.600	1.900	1.300	1.700	2.800	1.600	1.700
p	0.037	0.269	0.000	0.000	0.000	0.004	0.001	0.006	0.273	0.000	0.025
A - D											
t	-2.787	3.278	4.485	-7.383	-3.477	-2.583	-1.333	-1.407	3.493	0.878	-5.784
F	1.200	1.700	1.300	1.600	1.000	1.000	1.000	2.000	3.000	2.000	1.100
p	0.014	0.005	0.000	0.000	0.003	0.019	0.199	0.176	0.003	0.392	0.000
T - M											
t	-0.796	2.896	1.752	-3.720	-2.441	-2.591	-2.567	0.834	0.576	1.485	-0.373
F	1.400	1.300	1.300	1.600	1.000	1.300	1.100	1.600	1.100	2.400	1.000
p	0.435	0.009	0.095	0.001	0.025	0.018	0.018	0.414	0.571	0.153	0.713
T - D											
t	-5.542	5.204	10.979	-3.197	-3.214	6.008	5.912	-1.957	-6.461	5.375	-2.989
F	1.500	1.800	1.100	1.300	2.000	2.900	1.200	1.100	1.000	2.500	1.900
p	0.000	0.000	0.000	0.005	0.005	0.000	0.000	0.065	0.000	0.000	0.008
M - D											
t	-5.072	2.317	9.586	-0.123	-0.547	8.011	-7.999	-2.858	-6.519	5.144	-2.557
F	1.100	1.400	1.200	2.200	1.900	3.900	1.300	1.800	1.100	1.000	1.900
p	0.000	0.033	0.000	0.904	0.592	0.000	0.000	0.011	0.000	0.000	0.020

*Note: a reliably significant difference between the two means is highlighted in color

2016; Andrieieva et al., 2023). In this regard, researchers are increasingly paying attention to the problem of personalization of university physical education based on offering each student their own educational trajectory (Frąckiewicz, 2023).

The use of such a marker as somatotype is promising in solving this problem of university physical education (Cinarli et al., 2019; Campa, 2022). This conclusion is confirmed by the data obtained at the beginning of the study. In the samples created taking into account the somatotypes of, the distribution of individual results in the components of motor fitness corresponded to the normal one. A similar conclusion was reached in another study (Banakh et al., 2023). One of the reasons for this trend is the lack of polymodality, that is, the combination of two or more qualitatively different populations in one sample, even with the same other characteristics (Weir, & Vincent, 2020). When studying the functional, motor, and morphological characteristics of children and youth of a certain gender and age, there is a rather high polymodality. This is evidenced by a different from normal distribution of individual results in the studied characteristic. However, polymodality is much less or even disappears if not only gender and age are taken into account when forming a sample, but also belonging to a certain somatotype (Iedynak et al., 2021).

In addition, at the beginning of the study, data were obtained that showed significant differences in the results of different somatotypes in all components of motor fitness. The obtained data reflected the scientific position that each somatotype is characterized by features that relate to the reactivity of the organism, style of activity, rate of individual development and prerequisites of the individual's abilities (Silventoinen et al., 2021). Also, researchers (Wilmore et al., 2022) note the unequal rate of development of different functional systems, differences in the parameters of physiological characteristics and components of motor fitness of young men and girls with different somatotypes.

At the end of the research, the increase of differences in results of young men different somatotypes and very insignificant changes in components of their motor fitness was revealed. Such data confirmed the above information and were caused by a complex of reasons. One of the main ones was the lack of compulsory physical activity for students at the university, first in connection with Covid-19, and later – in connection with air raids due to the war. This lack of compulsory physical education classes could have led to a decrease in physical activity among, which is confirmed by the results of other researchers (Andrieieva et al., 2023). The above also

Table 4. Results of young men with different somatotypes at the end of the study and the statistical reliability of their change

N	The name of the component	M2	SD	Min	Max	(M1 – M2)	
						t	p
A-type (n=12)							
1	S	3.21	0.20	3.00	3.50	1.174	0.279
2	PTT	68.13	4.08	61.00	73.00	0	1.000
3	SBJ	191.38	6.37	179.00	197.00	-0.767	0.468
4	SMBT	5.00	0.44	4.50	5.50	-0.814	0.442
5	BE	73.50	8.00	63.00	83.00	-1.862	0.060
6	FE	18.00	3.78	12.00	23.00	-1.655	0.142
7	SU	39.38	5.10	33.00	47.00	-3.035	0.019
8	SAR	6.38	1.90	4.00	8.70	-1.111	0.303
9	SR	10.88	0.51	10.20	11.70	0.764	0.470
10	Cooper-test	2402.50	130.14	2280.00	2670.00	-1.586	0.157
11	SLB	4.13	2.10	1.00	7.00	0.314	0.763
T-type (n=22)							
1	S	2.90	0.31	2.50	3.40	0.000	1.000
2	PTT	71.58	3.03	67.00	79.00	-0.342	0.735
3	SBJ	218.17	9.73	194.00	229.00	-2.066	0.785
4	SMBT	6.31	0.73	5.50	7.80	-0.476	0.638
5	BE	87.92	10.76	76.00	108.00	-0.344	0.734
6	FE	24.30	5.82	14.00	37.00	-0.393	0.698
7	SU	47.42	7.43	31.00	60.00	-2.281	0.049
8	SAR	8.16	3.71	2.60	15.80	-0.205	0.839
9	SR	10.07	0.38	9.30	10.70	0.265	0.793
10	Cooper-test	2236.67	224.80	1980.00	2610.00	0.396	0.696
11	SLB	7.00	2.79	2.00	10.00	0.000	1.000
M-type (n=22)							
1	S	3.19	0.20	2.80	3.40	-0.504	0.611
2	PTT	65.90	4.72	58.00	72.00	-0.095	0.925
3	SBJ	208.60	10.54	195.00	227.00	0.399	0.695
4	SMBT	7.02	0.50	6.30	7.70	-0.242	0.812
5	BE	96.50	10.89	85.00	121.00	0.000	1.000
6	FE	31.60	6.65	23.00	45.00	-0.510	0.616
7	SU	53.50	6.69	45.00	66.00	5.838	0.000
8	SAR	6.90	2.49	2.90	9.60	0.077	0.940
9	SR	10.01	0.52	9.30	10.70	-0.000	1.000
10	Cooper-test	2077.00	223.56	1900.00	2440.00	0.782	0.444
11	SLB	7.40	2.01	4.00	10.00	-0.283	0.781
D-type (n=10)							
1	S	3.66	0.36	3.30	4.40	-0.299	0.769
2	PTT	61.11	6.51	52.00	70.00	-0.275	0.787
3	SBJ	170.22	9.56	153.00	184.00	0.380	0.709
4	SMBT	7.07	0.71	5.90	7.90	-0.211	0.835
5	BE	98.67	8.25	88.00	114.00	-0.031	0.975
6	FE	10.00	3.43	5.00	15.00	0.490	0.631
7	SU	26.22	6.28	16.00	35.00	0.324	0.750
8	SAR	11.00	3.67	6.00	16.00	-0.426	0.675
9	SR	11.13	0.37	10.70	11.80	0.491	0.630
10	Cooper-test	1750.00	160.78	1750.00	1980.00	0.485	0.634
11	SLB	9.22	1.86	6.00	11.00	0.740	0.470

Note: SR = Shuttle Run, SLB = single leg balance, S = sprint, PTT = Plate tapping test, SBJ= Standing Broad Jump, SMBT = seated medicine ball throw, FE= Flexion-extension, SU= Sit-up, BE= Back extension, SAR= Sit-and-Reach. A reliably significant difference between the two means is highlighted in color

Table 5. Differences in results of young men with different somatotypes at the end of the study

Result (points)	The name of the component										
	1	2	3	4	5	6	7	8	9	10	11
A - T											
t	2.483	-2.178	-6.840	-4.536	-3.230	-2.708	-2.662	-1.246	4.038	1.877	-2.126
F	2.000	2.000	2.000	3.000	2.000	2.000	2.000	4.000	2.000	3.000	2.000
p	0.023	0.043	0.000	0.000	0.005	0.014	0.019	0.229	0.001	0.077	0.048
A - M											
t	0.234	1.053	-4.053	-9.033	-4.984	-5.137	-4.927	-0.492	3.524	3.641	-3.367
F	1.000	1.000	3.000	1.000	2.000	3.000	2.000	2.000	1.000	3.000	1.000
p	0.818	0.308	0.001	0.0000	0.000	0.000	0.000	0.629	0.003	0.002	0.039
A - D											
t	-3.038	2.619	5.291	-7.115	-6.369	4.578	4.700	-3.193	-1.198	9.118	-5.315
F	3.200	2.500	2.300	2.600	1.100	1.200	1.500	3.700	1.900	1.500	1.300
p	0.008	0.019	0.000	0.000	0.000	0.000	0.003	0.006	0.025	0.000	0.000
T - M											
t	-2.516	3.417	2.211	-2.617	-1.854	-2.733	-2.000	0.913	0.295	1.663	-0.674
F	2.000	2.000	1.000	2.000	1.000	1.000	1.000	2.000	2.000	1.000	2.000
p	0.021	0.003	0.039	0.017	0.079	0.013	0.059	0.037	0.771	0.112	0.508
T - D											
t	-5.103	4.936	11.255	-2.386	-2.493	6.559	6.898	-1.743	-6.409	5.509	-2.304
F	1.400	4.600	1.000	1.100	1.700	2.900	1.400	1.000	1.100	2.000	2.400
p	0.000	0.000	0.000	0.028	0.022	0.000	0.000	0.097	0.000	0.000	0.033
M - D											
t	-3.492	1.850	8.275	-0.168	-0.485	8.735	9.135	-2.876	-5.366	3.621	-2.045
F	3.200	1.900	1.200	2.000	1.700	3.800	1.100	2.200	2.000	1.900	1.200
p	0.003	0.082	0.000	0.869	0.634	0.000	0.000	0.011	0.000	0.002	0.057

leads to another result, in particular, a clear negative impact on the psychological characteristics of students (Limone et al., 2022; Byshevets et al., 2024) and their functional characteristics (Banakh et al., 2023). This study revealed the negative impact of these factors (COVID-19 and the Russian-Ukrainian war) on the development of the components of motor fitness of during their studies at university (Mykytyuk et al., 2022).

Conclusions

First-year young men with different somatotypes are marked by peculiarities in the development of motor fitness components. At the beginning of the research the most (10) differences (reliability within $p < 0.05 \div 0.0000$) of all 11 components were found in a pair of samples T-D. In the other pairs, the number is as follows: D-M – 9, M-A – 8, T-M – 5, D-A and A-T – 7, but unequal components. At the end of the study, the differences increased somewhat: the number of components with different results in the D-A sample pair reached 10 out of all 11 subjects, in the A-T sample pair – 9; the number remained the same, but with some changes in the components themselves, in A-M (8) and T-M (5); the number decreased to 7 in the D-M sample pair.

A general trend in the change in the results of A-, T-, and M-types was established: the SU results changed by a statistically significant amount, but in the first sample the change was negative, in the other two samples – positive. The D-type was characterized by the absence of components in which the change in results was statistically significant.

Such data should be considered during physical education classes for students, as well as used in the development

of personal programs for their physical activity in their free time.

Conflicts of Interest

No conflicts of interest exist.

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З'ясування відмінностей у прояві компонентів рухової підготовленості юнаків за відсутності обов'язкової фізичної активності

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Авторський вклад: А – дизайн дослідження; В – збір даних; С – статаналіз; D – підготовка рукопису; Е – збір коштів

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Сучасна тенденція в модернізації університетського фізичного виховання передбачає розроблення кожному студенту персональної освітньої траєкторії.

Мета статті – визначити особливості в розвитку компонентів рухової підготовленості юнаків при врахуванні їх соматотипів і відсутності в університеті обов'язкової фізичної активності.

Матеріали та методи. У дослідженні взяли участь 39 юнаків 17,6±0,5 років, які тільки розпочали навчання в університеті, належали до різних соматотипів та не мали обмежень у використанні різних параметрів фізичної активності. Соматотип визначали за допомогою модифікованої методики Штефко-Островського. Вивчали 11 основних компонентів рухової підготовленості, використовували рекомендовані дослідниками рухові тести, відповідні методи тестування та інструменти. Кожний тест відповідав вимогам надійності, інформативності та дозволяв оцінити швидкість, частоту рухів, здатність до рівноваги, абсолютну м'язову силу, вибухову силу рук і ніг, динамічну силу м'язів живота і рук, гнучкість, спритність, аеробну витривалість. Параметри цих компонентів визначали у юнаків кожного наявного соматотипу, а також порівнювали кожний параметр у різних соматотипах. Тестування проводили на початку (січень) та наприкінці (травень-червень) навчального семестру, але протягом одного навчального року.

Результати. На початку та наприкінці дослідження розвиток компонентів рухової підготовленості у кожному соматотипі відрізнявся при порівнянні між собою (p на рівні від 0.05 до 0.000). Використані протягом дослідження обсяги та умови реалізації фізичної активності сприяли зміні результатів юнаків у деяких компонентах, але ці зміни були неоднаковими у різних соматотипах.

Висновки. Інформація про особливості розвитку компонентів рухової підготовленості юнаків із різними соматотипами є важливою для підвищення дієвості університетського фізичного виховання на засадах персоналізації змістової і диференціації нормативної основ цього процесу.

Ключові слова: рухова підготовленість, юнаки, соматотипи, персоналізація, університетське фізичне виховання, фізична активність, Covid-19.

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