ISSN 2521-1455 (Print)
ISSN 2523-4250 (Online)

DOI: 10.21802/artm.2024.1.29.56
UDC 611.982.018-023-057.875(477.85)

ANATOMICAL CHARACTERISTICS OF THE THIGH PARAMETERS THE STUDENTS OF BUKOVYNA

S.Yu. Karatieieva

Bukovinian State Medical University, Department of anatomy, clinical anatomy and operative surgery, Chernivtsi, Ukraine,
ORCID ID: 0000-0003-1836-8375, e-mail: Karatsveta@gmail.com

Abstract. It is known that the factor that determines success in sports is the morphological features of the structure of the human body. In order to establish the anatomical characteristics of the thigh parameters of students of Bukovyna who play football and handball, followed by modeling for sports selection, a study was conducted of students of higher educational institutions of Bukovyna (n=129), of which young boys - n=69 and young girls - n=60. The subjects were divided into a main group - 89 students who improved by playing football and handball and a control group - 40 students who did not do the sports. Students of the main group, in addition to the physical activity that was included in the program of their specialty during the year, additionally attended sports sections in football and handball during the year. Medium-intensity training took place under the control of a trainer, the frequency of training was 3.43 ± 1.26 days/week (90 minutes each). Students of the control group did not do the sports. The initial survey was conducted in 2021 year, and the same students were resurveyed in 2022 year. All subjects were subjected to an anthropometric study, according to the method of P.P. Shaparenka (thigh circumference in the upper third, in the middle third and in the lower third, body weight, height). So, it was found that when comparing the first and second measurement, the thigh circumference indicators at the second measurement (in dynamics after one year) were slightly higher in students who play football (young boys and young girls) in the upper, middle and lower thirds than in students who play handball (for students who play football ±3.43 cm, for students who play handball ±2.12 cm). The model for predicting the circumference of the thigh in the upper third on the right: Cpr=β1 + β2 + 0.493w – 0.135h, where Cpr is the circumference of the thigh in the upper third (right), w is body weight, h is height, β1= (49.735 for girls and 44.489 for young men), β2= (–1.391 for the soccer group; –2.321 for the handball group), on the left: Cpl=β1 + β2 + 0.465w, where Cpl is the circumference of the thigh in the upper third (left), w is body weight, β1= (25.736 for girls and 20.147 for boys), β2= (–1.333 for the football group; –0.515 for the handball group).

The model for predicting the circumference of the thigh in the middle of the right: Cmr=β1 + β2 + 0.460w – 0.183h, where Cmr is the circumference of the thigh in the middle of the right, w is body weight, h is height; β1= (52.567 for young girls and 48.930 for young boys), β2= (–2.235 for the football group; –1.968 for the handball group); on the left: Cml=β1 + β2 + 0.449w, where Cml is the thigh circumference in the middle of the left, w is body weight; β1= (20.716 for young girls and 20.943 for young boys), β2= (– 0.254 for the football group; –1.405 for the handball group). The model for predicting the circumference of the thigh in the lower third of the right: Cdr=β1 + β2 + 0.418w, where Cdr is the circumference of the thigh in the lower third of the right, w is body weight, β1= (25.560 for young girls and 20.165 for young boys), β2= (– 0.039 for the football group; 0.061 for the handball group); on the left: Cdl=β1 + β2 + 0.387w, where Cdl is the thigh circumference in the lower third on the left, w is body weight; β1= (24.638 for young girls and 18.523 for young boys), β2= (– 0.379 for the football group; –0.261 for the handball group). So, it is established that for significant predictors for predicting thigh circumference on the right in the upper and middle third are gender, sport, height and body weight, in the lower third are gender, sport and body weight, on the left are gender, sport and body weight.

Keywords: anatomy, students, football, handball, thigh, mathematical model.

Introduction. As you know, youthful age is characterized by completion of growth processes and the final formation of morpho - functional components of the main life support systems. Actually, this period of ontogenesis is considered the most significant in the study of specific morphological criteria for the diagnosis of normality and pathology, as a period of social and physical formation in the profession and a period of primary prevention of the predicted pathology [1-9].

The direction of management and control of training of athletes, their selection and orientation, modeling and forecasting unite the field of knowledge that has been intensively developed in the last two decades. This is due to the manifestation of the general trend and objectification of the system of training athletes, the implementation of achievements of scientific and technical progress, the use of opportunities of general scientific disciplines, such as cybernetics, morphometry, system approach, operations research, etc., and the search for reserves for improving the system of training athletes. In this regard, the formation of a complete system of knowledge requires consideration of management and control, selection and orientation, modeling and forecasting, as one of the key directions in the process of studying the theory of training athletes [10-14]. So, in our opinion, the study of anatomical parameters of the femoral area for the purpose of sports selection of promising athletes to achieve high results is extremely relevant and requires further research.

Research rationale. The studies that characterized the anatomical features of students who play football and handball and comparing them with peers who do not do sports, in order to establish parameters, are relevant and require further research.

Purpose: to establish the anatomical characteristics of thigh parameters of students of

ISSN 2521-1455 (Print)
ISSN 2523-4250 (Online)

Bukovyna who play football and handball, followed by modeling for sports selection.

Material and methods. The sample consisted of n=129 students, among them young boys - n=69 (53.5%) and young girls - n=60 (46.5%), who attended sections of team sports (football and handball) in Bukovyna. The initial survey was conducted in 2021 year, and the same students were re-surveyed in 2022 year. The subjects were divided into the main - 89 (69.0%), of them 48 (53.9%) – young boys and 41 (46.1%) – young girls, and control 40 (31.0%), of them 21 (52 .5% young boys and 19 (47.5%) young girls. The main group I consists of students who improved themselves by playing football - 46 (35.7%), the II main group consists of students who improved themselves in handball - 44 (33.3%), the III control group consists of ordinary students who did not do the sports - 40 (31.0 %). Among students who play football, 25 (54.3%) are young boys and 21 (45.7%) are young girls. Among the students who play handball are 24 (53.5%) young boys and 20 (46.5%) young girls. The age of the students was 17.45±1.15 years. The body weight of students engaged in handball is 68.88±3.02 kg, of which the body weight of young boys is 71.46±3.02 kg and the body weight of young girls is 65.55±3.02 kg, football is 70.58 ±3.02 kg, with of them, 72.20±3.02 kg of young boys and 68.56±3.02 kg of young girls. The height of students playing handball is 176.78±2.03 cm, of which 178.62±2.03 cm for young boys and 174.56±2.03 cm for young girls; in football 177.94±2.03 cm, of which 179.32±2.03 cm for young boys and 175.22±2.03 cm for young girls.

Students of the main group, in addition to the physical activity that was included in the program of their specialty during the year, additionally attended sports sections in football and handball during the year. Medium-intensity training took place under the control of a trainer, the frequency of training was 3.43 ± 1.26 days/week (90 minutes each). The subjects of the main group have sports divisions, and some of them are candidates for masters of sports. Sports experience - 4.38±2.15 years. Students of the control group did not play sports. All subjects were subjected to an anthropometric study, according to the method of P.P. Shaparenka (thigh circumference in the upper third, in the middle third and in the lower third, body weight, height) [15]. Welch's test was used to distribute the established parameters in both groups by gender. A paired t-test (paired-samples t-test) was performed to compare the respondents' indicators during the first measurement and the second one a year later. Statistical analysis of the obtained data was carried out using the licensed program RStudio.

Results. According to the comparison of the thigh circumference in the upper third in the initial study between football players and handball players of the main group, the indicators on the right almost do not differ, since the thigh circumference in the upper third only on the left in girls who play handball is greater by ±2.80 cm than in girls who play football (Table 1, 2, 3).

According to the comparison of the circumference of the thigh in the middle third in the initial study, there is a difference between the boys who play football and handball, because the boys who play football have values greater on the right by ±2.81 cm, and the young girls of the same group by ±1, 64 cm, on the left, young boys who play football have groups larger by ±8.67 cm, young girls by ±6.0 cm, than students who play handball (Tables 1, 2, 3). According to the comparison of the circumference of the thigh in the lower third during the initial study, there is no difference between the young boys who play football and handball on the right, but the young girls who play handball on the right have values greater by ±2.52 cm, on the left the young boys who play handball have larger by ±7.33 cm, in young girls of the same group it is larger by ±8.0 cm, from the subjects who play football (Tables 1, 2, 3).

Table 1

The dynamics comparison of thigh circumference of students who playing football

Thigh circumference (cm)												
Year	**In the upper third**				**In the middle third**				**In the lower third**			
	right		left		right		left		right		left	
	b	g	b	g	b	g	b	g	b	g	b	g
2021	54,29 ±4,40 p<0,05	51,26 ±4,40 p<0,05	50,09 ±3,50 p<0,05	47,06±3 ,50 p<0,05	43,83±4 ,13 p<0,05	40,76±4 ,13 p<0,05	53,92 ±4,27 p<0,05	50,87 ±4,27 p<0,05	50,64 ±3,21 p<0,05	45,61± 3,21 p<0,05	43,92 ±3,89 p<0,0 5	40,88 ±3,89 p<0,0 5
2022	55,86 ±1,23 p<0.001	52,83 ±1,23 p<0.001	54,46 ±1,17 p<0.001	51,41 ±1,17 p<0.001	48,65 ±1,22 p<0.001	45,62 ±1,22 p<0.001	57,90 ±1,31 p<0.001	54,87±1 ,31 p<0.001	51,92±1 ,46 p<0.001	48,87± 1,46 p<0.00 1	47,50 ±1,53 p<0.0 01	44,46 ±1,53 p<0.0 01

Note: «b» – young boys; «g» – young girls

ISSN 2521-1455 (Print)
ISSN 2523-4250 (Online)

Table 2

The dynamics comparison of thigh circumference of students who playing handball

Thigh circumference (cm)												
Year	**In the upper third**				**In the middle third**				**In the lower third**			
	right		left		right		left		right		left	
	b	g	b	g	b	g	b	g	b	g	b	g
2021	53,12 ±4,93 p<0,05	52,45 ±4,93 p<0,05	51,50 ±4,47 p<0,05	49,86 ±4,47 p<0,05	41,02 ±3,80 p<0,05	39,12 ±3,80 p<0,05	45,25 ±5,46 p<0,05	44,87 ±5,46 p<0,05	50,02 ±4,77 p<0,05	48,13±4 ,77 p<0,05	51,25 ±3,92 p<0,0 5	48,88 ±3,92 p<0,0 5
2022	53,88 ±1,41 p<0.001	52,78 ±1,41 p<0.001	52,41 ±1,38 p<0.001	52,00 ±1,38 p<0.001	49,06 ±1,39 p<0.001 .	48,15 ±1,39 p<0.001	53,65 ±1,56 p<0.001	52,78±1 ,56 p<0.001	51,50± 1,74 p<0.00 1	49,80±1 ,74p<0. 001	53,05 ±1,82 p<0.0 01	52,08 ±1,82 p<0.0 01

Note: «b» – young boys; «g» – young girls

Table 3

The dynamics comparison of thigh circumference of students who did not do the sports

Thigh circumference (cm)												
Year	**In the upper third**				**In the middle third**				**In the lower third**			
	right		left		right		left		right		left	
	b	g	b	g	b	g	b	g	b	g	b	g
2021	44,27 ±6,70 p<0,05	42,20 ±6,70 p<0,05	52,67 ±5,50 p<0,05	49,50 ±5,50 p<0,05	44,26 ±6,07 p<0,05	42,20 ±6,07 p<0,05	52,66 ±6,53 p<0,05	50,45 ±6,53 p<0,05	48,51 ±5,7 p<0,05	44,50 ±5,7 p<0,0 5	49,66±6 ,2 p<0,05	47,75 ±6,2 p<0,0 5
2022	44,90 ±1,24p< 0.001	42,30 ±1,24 p<0.001	53,47 ±1,14 p<0.001	51,15 ±1,14 p<0.001	45,00 ±1,23 p<0.001	43,00 ±1,23p< 0.001	52,83 ±1,29 p<0.001	50,75±1 ,29 p<0.001	48,72± 1,43 p<0.00 1	46,65 ±1,43 p<0.0 01	49,77±1 ,50 p<0.001	47,75 ±1,50 p<0.0 01

Note: «b» – young boys; «g» – young girls

By comparing the thigh circumference in the upper third in the re-examination between students who play football and handball, the difference is insignificant, because in the upper third on the right and on the left, the figures of young boys who play football are ±2.0 cm greater than those of young boys who play in handball, for young girls, the indicators on the right and on the left almost do not differ (in contrast to the results of the initial study) (Tables 1, 2, 3). By comparing the thigh circumference in the middle third in the dynamics between the studied students who play football and handball, there is also an obvious difference, as the young girls who play handball on the right have values greater by ±2.53 cm than the young girls who play football, and on the left, on the contrary, the young girls who play football have a circumference larger by ±2.09 cm, but the young boys on the right have almost no difference, on the left, the young boys who play football have values larger than the young boys who play handball by ±4.25 cm (in contrast to the results of the primary study) (Tables 1, 2, 3).

According to the comparison of the thigh circumference in the lower third, there is almost no difference in the dynamics between the studied students who play football and handball on the right, but on the left the indicators are greater for young boys who play handball by ±5.55 cm, for young girls by ±7.62 cm , from the studied students who play football (Tables 1, 2, 3).

So, there is a significant difference in the values of the thigh circumference in the upper third on the right between the first (M = 52.775, SD = 4.402) and the second (M = 54.345, SD = 1.232) measurements in young boys and young girls who play football, and also on the left between the first (M = 48.575, SD = 3.452) and the second (M = 52.910, SD = 1.170), $p < 0.001$. It was established that the circumference of the thigh in the upper third increased more on the left (for young boys ±4.37 cm, for young girls ±4.35 cm) than on the right ±1.57 cm.

There is a significant difference in thigh circumference parameters in the middle third on the right between the first (M = 42.295, SD = 4.133) and the second (M = 47.135, SD = 1.222), and on the left between the first (M = 52.395, SD = 4.271) and the second (M = 56.385, SD = 1.318), $p < 0.001$. It was established that the circumference of the thigh in the middle third increased approximately equally in both genders on the right and on the left ±4.41 cm.

There is a significant difference in the values of the thigh circumference in the lower third of the right between the first (M = 48.125, SD = 3.216) and the second (M = 50.395, SD = 1.467) measurements; and also on the left between the first (M = 42.400, SD = 3.894) and the second (M = 45.980, SD = 1.536), $p < 0.001$. It was established that the increase in the circumference of the thigh in the lower third in young boys is greater on the left

ISSN 2521-1455 (Print)
ISSN 2523-4250 (Online)

±3.58 cm than on the right ±1.28 cm, in young girls it is approximately the same on the right and left ±3.42 cm.

By comparing the dynamics of hip circumference of students who play handball in the upper third on the right between the first (M = 52.785, SD = 4.939) and the second (M = 53.330, SD = 1.412) measurements in young boys and young girls, there is almost no difference, on the left there is a small the difference between the first (M = 50.68, SD = 4.473) and the second (M = 52.205, SD = 1.388), $p < 0.001$. It was established that the thigh circumference in the upper third slightly increased only on the left in young girls by ±2.14 cm. In the middle third, there is a significant difference in thigh circumference parameters on the right between the first (M = 40.070, SD = 3.800) and the second (M = 48.605, SD = 1.399) measurements, and on the left between the first (M = 45.060, SD = 5.460) and by the second (M = 53.215, SD = 1.564) measurements, $p < 0.001$. It was established that the circumference of the thigh in the middle third increased on the right and on the left in both genders, where young boys ± 8.22 cm, and young girls ± 8.47 cm.

There is also a small difference in the values of the thigh circumference in the lower third on the right between the first (M = 49.075, SD = 4.771) and the second (M = 50.650, SD = 1.741) measurements, on the left between the first (M = 50.065, SD = 3.921) and the second (M = 52.565, SD = 1.823) measurements. It was established that there is almost no increase in thigh circumference in the lower third of the right in young boys, a small difference of ±1.67 cm in young girls, as well as a difference of ±1.80 cm in the left in young boys, ±3.20 cm in young girls. When comparing the circumference of the thigh in the upper, middle and lower thirds in the subjects of the control group who did not do the sports, there is almost no difference between the first and second measurements. It was also found that when comparing the first and second measurement, the thigh circumference values at the second measurement (in dynamics after one year) were slightly higher in students who play football (young boys and young girls) in the upper, middle and lower thirds than in students , who play handball (for students who play football ±3.43 cm, for students who play handball ±2.12 cm.

Discussion of research results. So, for the purpose of selecting promising students to play football and handball, mathematical models for predicting parameters (thigh circumference in the upper third, in the middle and in the lower third) were derived.

Model for predicting thigh circumference in the upper third on the right:

$Cpr=\beta1 + \beta2 + 0.493w - 0.135h$, where Cpr – thigh circumference in the upper third of the right, w – body weight, h – height, β1= (49.735 for young girls and 44.489 for young boys), β2= (–5.215 for the control group; –1.391 for the football group; –2.321 for the handball group), on the left: $Cpl=\beta1 + \beta2 + 0.465w$, where Cpl is the thigh circumference in the upper third (left), w is body weight, β1= (25.736 for young girls and 20.147 for young boys), β2= (–4.239 for the control group; –1.333 for the football group; –0.515 for the handball group). The model for predicting the circumference of the thigh in the middle right: $Cmr=\beta1 + \beta2 + 0.460w - 0.183h$, where Cmr is the circumference of the thigh in the middle third of the right, w is body weight, h is height; β1= (52.567 for young girls and 48.930 for young boys), β2= (–3.944 for the control group; –2.235 for the football group; –2.235 for the football group; –1.968 for the handball group); on the left: $Cml=\beta1 + \beta2 + 0.449w$, where Cml is the thigh circumference in the middle of the left, w is body weight; β1= (20.716 for young girls and 20.943 for young boys), β2= (–4.977 for the control group; 0.254 for the football group; –1.405 for the handball group). The model for predicting the circumference of the thigh in the lower third of the right: $Cdr=\beta1 + \beta2 + 0.418w$, where Cdr is the circumference of the thigh in the lower third of the right, w is body weight, β1= (25.560 for young girls and 20.165 for young boys,) β2= (–4.497 for the control group; 0.039 for the football group; 0.061 for the handball group); on the left: $Cdl=\beta1 + \beta2 + 0.387w$, where Cdl is the thigh circumference in the lower third on the left, w is body weight; β1= (24.638 for young girls and 18.523 for young boys), β2= (–0.051 for the control group; 0.379 for the football group; –0.261 for the handball group). The coefficient of determination is 99.7%. Significant predictors for predicting hip circumference on the right in the upper and middle third are gender, sport, height and body weight, in the lower third are gender, sport and body weight, on the left are gender, sport and body weight.

Conclusions: 1. It established that when comparing the first and second measurement, the thigh circumference values at the second measurement (in dynamics after one year) were slightly higher in students who play football (young boys and young girls) in the upper, middle and lower thirds than in students who play handball (for students who play football ±3.43 cm, for students who play handball ±2.12 cm).

2. Model for predicting the circumference of the thigh in the upper third on the right: $Cpr=\beta1 + \beta2 + 0.493w - 0.135h$, where Cpr is the circumference of the thigh in the upper third (right), w is body weight, h is height, β1= (49.735 for young girls and 44.489 for young boys), β2= (–1.391 for the football group; –2.321 for the handball group), on the left: $Cpl=\beta1 + \beta2 + 0.465w$, where Cpl is the circumference of the thigh in the upper third (left), w is body weight, β1 = (25.736 for young girls and 20.147 for young boys), β2= (–1.333 for the football group; –0.515 for the handball group).

3. Model for predicting the circumference of the thigh in the middle of the right: $Cmr=\beta1 + \beta2 + 0.460w - 0.183h$, where Cmr is the circumference of the thigh in the middle of the right, w is body weight, h is height; β1= (52.567 for young girls and 48.930 for young boys), β2= (–2.235 for the football group; –1.968 for the handball group); on the left: $Cml=\beta1 + \beta2 + 0.449w$, where Cml is the thigh circumference in the middle of the left, w is body weight; β1= (20.716 for young girls and 20.943 for young boys), β2= (– 0.254 for the football group; –1.405 for the handball group).

4. Model for predicting the circumference of the thigh in the lower third on the right: $Cdr=\beta1 + \beta2 + 0.418w$, where Cdr is the circumference of the thigh in the lower third on the right, w is body weight, β1= (25.560 for young girls and 20.165 for young boys), β2= (– 0.039 for the football group; 0.061 for the handball group); on the left: $Cdl=\beta1 + \beta2 + 0.387w$, where Cdl is the thigh circumference in the lower third on the left, w is body weight; β1= (24.638 for young girls and 18.523 for young boys), β2= (– 0.379 for the football group; –0.261 for the handball group).

ISSN 2521-1455 (Print)
ISSN 2523-4250 (Online)

5. Significant predictors for predicting hip circumference on the right in the upper and middle third are gender, sport, height and body weight, in the lower third are gender, sport and body weight, on the left are gender, sport and body weight.

Prospects for further research. Further study of anatomical parameters of students to solve problems of selection and sports orientation.

References.

1. Ratko Pavlović, Ilona Mihajlović, Nikola Radulović, Siniša Nikolić. Anthropometric parameters of elite male runners sprint: are body height and body weight good predictors of results. Health, sport, rehabilitation. 2022; 8(3): 64-74 DOI: https://doi.org/10.34142/HSR.2022.08.03.05
2. Hliadia SO, Boreiko NIu, Yushko OV. Antropometrychni vymiriuvannia i otsinka funktsionalnoho stanu. Metodychni rekomendatsii do praktychnoi roboty dlia studentiv NTU «KhPI» dennoi formy navchannia usikh spetsialnostei z dystsypliny «Fizychne vykhovannia». Kharkiv. 2021; 25. [Ukrainian].
3. Vovk YuM, Vovk OIu. Indyvidualni anatomichna minlyvist ta yikh kliniko-morfolohichne znachennia. Kharkiv. 2019; 188 s. [Ukrainian].
4. Andriichuk V.M. Zakonomirnosti pokaznykiv fizychnoho rozvytku yunakiv pid chas navchannia u vyshchykh navchalnykh zakladakh. Dysertatsiia na zdobuttia naukovoho stupenia doktora medychnykh nauk. 2017; Vinnytsia: 325. [Ukrainian].
5. Perez AJ. Investigation: NFL improperly attempted to influence concussion research. USA Today Sports. May 23. 2016 http://www.usatoday.com/story/sports/nfl/2016/05/23/nfl-concussion-research-investigation-nih /84787426/.
6. Josu Gomez-Ezeiza, Nicholas Tam, Jon Torres-Unda, Cristina Granados, Jordan Santos-Concejero. Anthropometric characteristics of top-class Olympic race walkers. Journal of Sports Medicine and Physical Fitness. 2019; 59(3): 429-433. https://doi.org/10.23736/S0022-4707.18.08363-9
7. Kozin S, Cretu M, Kozina Z, Chernozub A, Ryepko O, Shepelenko T, Sobko I., Oleksiuk M. Application closed kinematic chain exercises with eccentric and strength exercises for the shoulder injuries prevention in student rock climbers: A randomized controlled trial. Acta of Bioengineering and Biomechanics. 2021, 23(2). https://doi.org/10.37190/ABB-01828-2021-01
8. Budzhak V.V. Biometriia: navch. posib. Chernivtsi: Chernivetskyi natsionalnyi universytet. 2016: 272 [Ukrainian].
9. Sorokyn VA, Ponomarev YE. Rozvytye professyonalno – fyzkulturnыkh kompetentsyi po proektyrovanyiu ozdorovytelnыkh tekhnolohyi v systeme podhotovky spetsyalysta po fyzycheskomu vospytanyiu. Hosudarstvennoe y munytsypalnoe upravlenye. Uchenыe zapysky. 2020; 1:256-260. DOI: 10.22394/2079-1690-2020-1-1-256-260 [Ukrainian].
10. Kristina L. Kendall, David H. Fukada, Parker N. Hyde, Abbie E. Smith-Ryan, Jordon R. Moon, Jeffrey R. Stout. Estimating fat-free mass in elite-level male rowers: a four-compartment model validation of laboratory and field methods. Journal of Sports Science. 2017; 35(7): 624-633. https://doi.org/10.1080/02640414.2016.1183802
11. Danielle Logue, Sharon M. Madigan, Eamonn Delahunt, Miriam Heinen, Sarah-Jane Mc Donnell, Clare A. Corish. Low Energy Availability in Athletes: A Review of Prevalence, Dietary Patterns, Physiological Health, and Sports Performance. Sports Medicine.2018; 48 (1): 73-96. https://doi.org/10.1007/s40279-017-0790-3
12. Kozina ZhL, Bazilyuk TA, Boyko AG. Analysis of the structure of the integrated preparedness of qualified handballers using multidimensional analysis methods. Health, sport, rehabilitation. 2017; 3(2): 15-24. doi:10.34142/zenodo.1109904
13. Karatieieva SYu, Slobodian OM, Moseychuk YuYu, Hauriak OD, Goy RS. Study of anthropometric and morphometric parameters in the training of atheletes. Ukrainskyi zhurnal medytsyny, biolohii ta sportu. Mykolaiv. 2021; 6, 5 (33): 16-22. DOI: 10.26693/jmbs06.05.016 [Ukrainian]
14. Karatieieva S, Slobodian O, Lukashiv T, Honchar H, Komar V, Kozlovska S. The determination of distal hip circumference in universities students depending on the sport type. Health, sport, rehabilitation. 2022; 8(3): 27-37 DOI: https://doi.org/10.34142/HSR.2022.08.03.02
15. Shaparenko PF. Antropometriia. Vinnytsia: VDMU im. M.I. Pyrohova, 2000: 71 s. [Ukrainian].

УДК 611.982.018-023-057.875(477.85)

АНАТОМІЧНА ХАРАКТЕРИСТИКА ПАРАМЕТРІВ СТЕГНА СТУДЕНТІВ БУКОВИНИ

С.Ю. Каратєєва

Буковинський державний медичний університет, кафедра анатомії, клінічної анатомії та оперативної хірургії, м. Чернівці, Україна,
ORCID ID: 0000-0003-1836-8375,
e-mail: Karatsveta@gmail.com

Резюме. З метою встановлення анатомічної характеристики параметрів стегна студентів Буковини, які грають у футбол та гандбол з наступним моделюванням для спортивного відбору проведено дослідження студентів вищих навчальних закладів Буковини (n=129), з них юнаків – n=69 та дівчат – n=60. Усім досліджуваним було проведено антропометричне дослідження, за методикою П.П. Шапаренка (окружність стегна в верхній третині, в середній третині та в нижній третині, масу тіла, зріст). Отже, модель для прогнозування окружності стегна в верхній третині справа: $Cp_r=\beta_1 + \beta_2 + 0{,}493w - 0{,}135h$, де Cp_r– окружність стегна в верхній третині (справа), w– вага, h– ріст, β_1= (49,735 для дівчат та 44,489 для юнаків), β_2= (–1,391 для групи футбол; –2,321 для групи гандбол), зліва: $Cp_l=\beta_1 + \beta_2 + 0{,}465w$, де Cp_l – окружність стегна в верхній третині (зліва), w – вага, β_1= (25,736 для дівчат та 20,147 для юнаків), β_2= (–1,333 для групи футбол; –0,515 для групи гандбол). Модель для прогнозування окружності стегна в середині справа: $Cm_r=\beta_1 + \beta_2 + 0{,}460w - 0{,}183h$, де Cm_r – окружність стегна в середині справа, w – вага, h– ріст; β_1= (52,567

ISSN 2521-1455 (Print)
ISSN 2523-4250 (Online)

для дівчат та 48,930 для юнаків), β_2= (–2,235 для групи футбол; –1,968 для групи гандбол); зліва: $Cm_l=\beta_1 + \beta_2 + 0{,}449w$, де Cm_l – окружність стегна в середині зліва, w – вага; β_1= (20,716 для дівчат та 20,943 для юнаків), β_2= (– 0,254 для групи футбол; –1,405 для групи гандбол). Модель для прогнозування окружності стегна в нижній третині справа: $Cd_r=\beta_1 + \beta_2 + 0{,}418w$, де Cd_r– окружність стегна в нижній третині справа, w – вага, β_1= (25,560 для дівчат та 20,165 для юнаків), β_2= (– 0,039 для групи футбол; 0,061 для групи гандбол); зліва: $Cd_l=\beta_1 + \beta_2 + 0{,}387w$, де Cd_l– окружність стегна в нижній третині зліва, w – вага; β_1= (24,638 для дівчат та 18,523 для юнаків), β_2= (– 0,379 для групи футбол; – 0,261 для групи гандбол).

Ключові слова: анатомія, студенти, футбол, гандбол, стегно, математична модель.

Стаття надійшла в редакцію 30.01.2024 р.
Стаття прийнята до друку 27.03.2024 р.