

THE MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

NATIONAL TECHNICAL UNIVERSITY  
«KHARKIV POLYTECHNIC INSTITUTE»

FACULTY OF SOCIAL - HUMANITARIAN TECHNOLOGIES

«PHYSICAL EDUCATION» DEPARTMENT

**«Anthropometric measurements and assessment of functional status»**

Guidelines

to practical work for students NTU «KhPI»  
full-time education of all specialties  
for the discipline "Physical education"

Kharkiv  
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Methodological recommendations for students of NTU "KhPI" for the practical work "Anthropometric measurements and assessment of functional state" from the discipline "Physical education"/ Dev.: Hliadia S.O., Yushko O.V., Boreiko N.Y., Bilous O.V. - Kharkiv: NTU «KhPI», 2023. – 25 p.

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Methodological recommendations were reviewed and approved at the department meeting «Physical education» NTU «KhPI».

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Methodical recommendations have been prepared for full-time students of all specialties NTU «KhPI» (main medical group, special medical group) for transferring the educational process to a distance form of education.

Students are offered the organization of self-monitoring of their physical condition, mastering the anthropometry method by studying their own body dimensions, enriching the necessary theoretical knowledge, conducting a functional test (orthostatic test), the ability to analyze the obtained results.

Evaluation criteria for practical work have been established «Anthropometric measurements and assessment of functional status».

A sample structure of practical work is provided.

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## INTRODUCTION

In order to optimize the educational process in physical education in the distance form of learning and receiving feedback, it is proposed to carry out practical work «Anthropometric measurements and assessment of functional status».

This work is concluded for students of all courses of study of the main medical group and special medical group when the educational process is transferred to the distance form of education. Students are offered the organization of self-monitoring of their physical condition, mastering the anthropometry technique by studying their own body dimensions, enriching the necessary theoretical knowledge, conducting a functional test (orthostatic test), and the ability to analyze the results obtained.

Practical work includes:

1. Measurement of body sizes; body weight measurement.
2. Assessment of functional status.
3. Mathematical calculation.
4. Analysis of work results.

Upon completion of this work, the student consistently analyzes and summarizes all values of measurement features in writing, performs mathematical calculations, defines and describes his body type and determines the body's reaction to a functional test, forms a thorough conclusion.

When the educational process at the university switches to the regular (in-person) mode, the student presents the practical work at the nearest practical lesson in printed form to control the measurements made.

According to the results of the practical work "Anthropometric measurements and assessment of functional state", it can become a means of current information support of the educational process in the discipline "Physical education" in the distance form of education and will allow monitoring the physical condition of students of all specialties.

## General terms

Anthropometric measurements make it possible to determine the level and features of physical development, the degree of its correspondence to age and gender, deviations in it, as well as to assess changes in a person's physical development that occur under the influence of physical exercises and sports.

Purpose of practical work:

1. To master the anthropometry method by studying the dimensions of one's own body.
2. Master the method of assessing physical development using indices - the ratio of anthropometric indicators obtained using mathematical calculations.
3. Assess the functional state of the body.

Tasks of practical work:

1. Perform all measurements in accordance with the above methods.
2. Enter the obtained data into the tables.
3. Carry out the necessary calculations.
4. Conduct analysis, generalization of work results.

Measuring equipment: height meter - height measurement (in case of absence - tape measure), centimeter tape - measurement of body circumference, scale - measurement of body weight, stopwatch - time control (function in mobile phone).

Most of the work parameters are quite simple, and can be performed at home or in a dormitory. Help in taking measurements can be provided by parents, friends, classmates, and if they are not available, take it yourself, looking in the mirror.

Anthropometric measurements should be carried out according to the following requirements:

- The temperature in the room is not lower than 16-18°C with good lighting.
- Measurements are carried out at the same time of day (preferably in the 1st half of the day).
- Areas of the body where measurements are taken must be naked.
- Stand on a hard, level floor with bare feet or thin socks.

Observe the accuracy of measurements, using clear anthropometric points, deviations of no more than 2-3 mm. Record the average value of the closest measurement results to the measurement map.

## BODY DIMENSIONS MAP

### Body dimensions (cm) and body weight (kg)

№	Measurable features	The magnitude of the sign		Method of calculation
		right	left	
1	Height, cm			-
2	Weight, kg			-
3	Body mass index (BMT, kg/m <sup>2</sup> )			= i.2/i.1
4	Head circumference (cm)			
5	Neck circumference (cm)			-
6	Chest circumference at rest (cm)			-
7	Circumference of the chest on inhalation (cm)			-
8	Circumference of the chest on exhalation (cm)			-
9	Chest dissimilarity (cm)			= i.7-i.8
10	Breast proportionality index (IPb)			= i.6/i.1x100%
11	Abdominal circumference at rest (cm)			-
12	The circumference of the maximally bulging abdomen (cm)			-
13	The circumference of the maximally retracted abdomen (cm)			-
14	Abdominal dissimilarity (cm)			= i.12-i.13
15	Shoulder circumference in tension (cm)			-
16	Shoulder circumference at rest (cm)			-
17	Shoulder dissimilarity (cm)			= i.15-i.16
18	Muscle development index			=i.15i.16/i.16x100%
19	Circumference of the forearm (cm)			
20	Wrist circumference (cm)			-
21	Hip circumference (cm)			-
22	Index of the ratio of the circumference of the abdomen to the circumference of the hips			<b>See further in the text № 22</b>
23	Leg circumference (cm)			-
24	Ankle circumference (cm)			-

## ASSESSMENT OF THE FUNCTIONAL STATE

### Orthostatic test (according to materials G.A. Makarova, 2003)

№	Measurable features	The magnitude of the sign	Method of calculation
1	Heart rate while lying in a horizontal position at rest in 15 s x 4		HR <sub>1</sub> =HR lying in 15 s x 4
2	Heart rate - stand up slowly (in 2-3 s) take a vertical position, measure the pulse after first minute in 15 s x 4		HR <sub>2</sub> =HR стоячи по закінченню 1-хв. за 15 с x 4
3	Reaction of the cardiovascular system of the body		difference i.2-i.1

### Organization of practical work

The practical work "Anthropometric measurements and assessment of functional state" is performed in written form according to the following points:

1. **Introductory** - familiarization with the topic and nature of the work (purpose, task), preparation of the necessary equipment, study of relevant literature and its processing.

2. **The main one** – consists of subsections:

- conducting anthropometric measurements;
- performing a functional test;
- performing mathematical calculations;
- analysis and description of work results;
- forming conclusions.

3. **Final** - registration of practical work according to the given sample with mandatory compliance with the requirements.

4. **Presentation of practical work** – sending the finished work to the teacher's e-mail address **office 365**.

5. **5. Verification of practical work** – performed by the teacher (timeliness of work delivery, completeness of anthropometric measurements, analysis of the obtained results: degree of asymmetry in body dimensions covered, degree of physical development (according to indices, excursions), determination of body type and its thorough description; assessment of physical condition and its description).

6. **Assessment of practical work** – the teacher evaluates the student's practical work according to evaluation criteria.

**EVALUATION CRITERIA OF PRACTICAL WORK  
«ANTHROPOMETRIC MEASUREMENTS AND ASSESSMENT OF  
FUNCTIONAL STATUS»**

**Evaluation criteria for practical work «Anthropometric measurements and  
assessment of functional status»**

№	Criteria	Points
1	The practical work was carried out carefully and consciously in full, a thorough analysis of all results was carried out, their detailed characteristics were given, one's own position was reflected, and clear conclusions were formed. All registration requirements are met.	21
2	In the practical work, all measurements, analysis and description of the results are not complete, the main conclusions are formed. Minor errors in registration requirements.	17
3	In the practical work, a part of the measurements was carried out (no more than 3 points are missing), there is no analysis and description of individual results, conclusions are formed. Minor errors in registration requirements.	13
4	Practical work is partially carried out - most measurements are missing, mathematical calculations, analysis and description of the results are not interconnected, the conclusions do not correspond to reality (or are missing at all).	8
5	In practical work, only measurement (or share) was carried out.	4
6	There is no practical work	0

## **REQUIREMENTS FOR PRACTICAL WORK «ANTHROPOMETRIC MEASUREMENTS AND ASSESSMENT OF FUNCTIONAL STATUS»**

The results of the practical work are presented in writing according to the BODY MEASUREMENT MAP AND FUNCTIONAL STATUS ASSESSMENT according to the template attached below (Appendix A).

**The preparation of practical work in written form is carried out in accordance with general requirements:**

1. Text editor Microsoft Word, file in doc or docx format.
2. Times New Roman font, 14 point; alignment - "By width"; spacing "One and a half» (1,5 Lines); paragraph indentation – five characters (1,25 cm); upper and lower fields – 2 cm, left – 3 cm, right – 1 cm. Paragraph indentation must be the same throughout the text and equal to five characters (1,25 cm).
3. Language – English, Ukrainian.
4. Page numbering should be continuous. The serial number of the page is indicated by an Arabic numeral and placed in the upper right corner of the page without a dot or dash.
5. 5. The title page (Appendix A) is included in the general page numbering of the written work, but the page number on the title page, as a rule, is not set. Chapters should also be numbered with Arabic numerals.
6. Transposition of syllables in words is not used.

**The practical work file is signed in the form: student's last name, group, PW 2 (where PW 2 – practical work 2), teacher's last name.**

### **Structure of practical work:**

- 1) Title page (see appendix).
- 2) Map of body measurements.
- 3) Assessment of functional status.
- 4) Analysis and description of work results.
- 5) Conclusions.

**Title page** has the form of responsibilities - the Ministry of Education and Science of Ukraine; name of the higher educational institution, name of the department where the work was performed, group, surname, first name, patronymic of the author (Appendix A).

**Map of body measurements** is filled gradually, all the values of the features are fixed, if it is necessary to measure individual values of the features, repeat their measurement, mathematical calculations are carried out. It is desirable to carry out all measurements at once, that is, conditionally in one session.

**Assessment of functional status** – one test is proposed, which does not have physical load and is completely natural. The test can be carried out a second time, on the second day in good condition and well-being. It is advisable to conduct the test with the help of an assistant. As a rule, a bed is used to adopt a horizontal body position. The received data is recorded in a table.

**Analysis and description of work results** - considering the specific values of the sign to give the corresponding characteristic:

- degree of asymmetry in the length of body measurements - explanation, approximate causes;
- the degree of development of respiratory muscles, abdominal and shoulder muscles (according to excursion data) - explanation, approximate causes;
- relevant indices – characteristics, explanation of discrepancies in indicators, disease risk factors.

If necessary, explain individual values or indicators on which you need to focus, cite additional types of measurements, indices, specific examples, data from literary sources, statements of specialists, scientists (provide references to sources - when referring to the name of a specific scientist in the text, it must be preceded by such corresponding initials should be added to the last name), etc.

Avoid repetitions, grammatical, spelling and syntactical errors. Strive to structure the text in the course of determining the magnitude of the feature, performing mathematical calculations and their timely characterization.

The description of each characteristic value should be started with a new paragraph, the name of the characteristic value should be highlighted in bold font, and the subsequent description should be in normal font.

**Conclusions** is the general result of practical work. The main indicators are summarized and substantiated, a summary of the entire work is given.

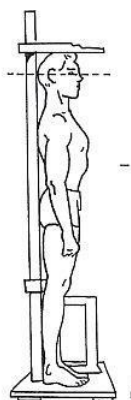
**In conclusions** of practical work to note:

- determine your body type - describe based on the results of all measurements and calculations, if necessary, provide the necessary explanations;
- assessment of functional status - explanation;
- to reveal one's position on the conducted research - generalization, positive aspects of the work, considerations.

**Appendix A provides a sample structure of practical work. Analysis and description of the results of practical work, conclusions do not have defined limitations.**

## **CHARACTERISTICS OF BODY DIMENSIONS, BODY WEIGHTS, METHODS OF THEIR MEASUREMENT AND CALCULATION**

1. **Height** (body length) – the height of the top point above the plane of support (the height of the figure in a vertical position from the top of the head to the heel). To measure height, a special device is used - a vertical height meter, which, as a rule, is located in a medical office.



It consists of a stand with divisions and a movable coupling with a tablet, which lowers until it collides with the head of the measured object. While standing, the student stands on the wooden plane of the height meter with his back to the vertical bar, touching it with his head, heels, buttocks, between the scapular area with his shoulders pulled back. Hands should be lowered along the body, stomach - pulled up, heels - together, socks - separately, legs spread at the knees. The position of the head should be such that the upper edge of the ear cup and the lower edge of the eye socket are in the same horizontal plane. The movable bar is applied to the head without pressure, but tightly.

At home, height can be measured by the following actions (with the help of an assistant):

- Stand barefoot with your back to the wall.
- Lower your arms along your body, straighten your shoulders, straighten your back.
- Legs should be straightened, heels closed.
- Keep your head straight and look ahead.
- The shoulder blades, protruding parts of the buttocks and heels should touch the wall.

- After taking the desired position, the assistant sets a right-angled triangle with one side (leg) on the upper point of the head, while touching the hair, and with the other side (leg) presses it against the wall. In the absence of a right triangle, a book, flat board, etc. are used.

- At the level of the lower horizontal side of the triangle (board), the assistant makes a pencil mark on the wall.

- Use a tape measure to measure the distance from the floor to the mark.

**Pay attention.** Height measurement should be carried out in the morning - by evening, a person's height can decrease by 2-3 cm. This is due to being in an upright position and the load on the spine, which leads to a decrease in the distance between the vertebrae.

2. **Body weight** – health indicator. At home, weighing is carried out on floor scales (electronic or mechanical):

- For the most accurate results, weighing should be done in the morning, on an empty stomach, after visiting the toilet.
- When weighing, wear a minimum of clothing (underwear).

- Stand on the scale so that the legs are symmetrically positioned in relation to the center of the scale.



**Pay attention.** During the day, body weight can vary by 1.5-2 kg. That is why, when observing weighing, it is desirable to carry out at the same time of the day.

3. **Body mass index** - a value that allows you to assess the degree of correspondence between a person's mass and his height, and thereby indirectly assess whether the mass is insufficient, normal, excessive (obesity).

The body mass index is calculated according to the formula:

$$IMT=M/L^2,$$

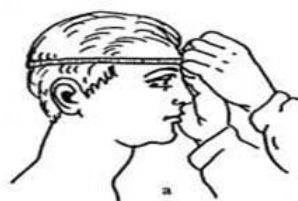
where: M – body weight (kg); L – height in meters squared (m<sup>2</sup>), and is measured in kg/ m<sup>2</sup>.

Body weight classification in adults and frequency of chronic non-infectious diseases:

Classification	BWI, kg/ m <sup>2</sup>	The probability of developing diseases		
		Cardiovascular	Broncho-pulmonary	Endocrine
Insufficient mass	18,4 and less	low	increased	low
Normal weight	18,5—24,9	low	low	low
Excess weight	25,0—29,9	average	low	low
Obesity I degree	30,0—34,9	increased	low	average
Obesity II degree	35,0—39,9	significantly increased	possibly increased	increased
Obesity III degree	40,0 and more	significantly increased	increased	significantly increased

The overall dimensions of a person's body are measured with a centimeter tape, which should be close to the body, and the zero mark of the tape division should be in front of the person's field of vision..

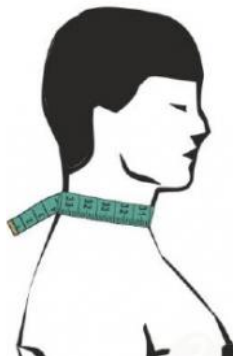
4. **Head circumference** – the tape is applied along the largest perimeter of the head.



With a centimeter tape, wrap around the head in a circle so that the line of girth passes through the most protruding back of the head, on the side it passes above the tips of the ears, and on top - a little above the eyebrows.

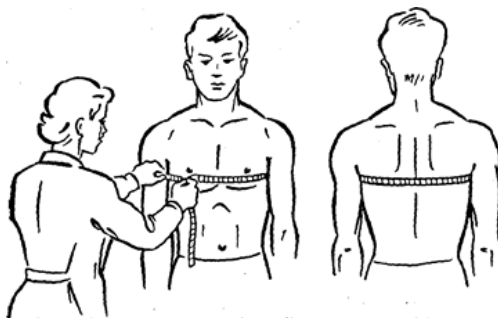
**Pay attention.** The tape should sit properly on the head, not slip, not shift from one side to the other or press.

5. **Neck circumference** – measured around the neck, placing it exactly in the middle under the thyroid cartilage (adam's apple).



The ideal neck circumference measurement is up to 37 cm for men and up to 34 cm for women.

6. **Chest circumference** - indicator of physical development. The measurement is carried out in three states: at rest, inhaling (item 7) and exhaling (item 8) - do not remove the tape.



- During the measurement, the examinee stands straight, without straining the muscles and without raising the shoulders, hands down along the body.
- When measuring at rest with normal breathing (pause), the centimeter tape in front should pass along the lower edge near the nipple circles (men), in women - above the mammary glands at the level of the fourth rib, and behind - under the lower edges of the shoulder blades.

**Pay attention.** When measuring at the moment of a pause, the examinee is asked any question (so that he relaxes) and measurements are taken during his answer.

Measurement of the circumference of the chest during maximum inhalation (item 7) and maximum exhalation (item 8) is carried out with the same location of the centimeter tape.

**Pay attention.** It is necessary to carefully and constantly monitor that during the measurement during inhalation the examinee does not raise the shoulders and does not strain the muscles, and during exhalation does not bend the back and does not bring the

shoulder joints forward. Also, pay attention to the correct location of the centimeter tape.

**9. Chest dissimilarity** - the difference between the values of the circumference at maximum inhalation and maximum exhalation is the excursion (mobility) of the chest.

Classification	Chest dissimilarity, cm
Height	10,0 and more
Average	5,0-9,9
Low	4,9 and less

**10. Breast proportionality index (IPb)** – the ratio between chest circumference (CC) at rest and height.

The proportionality index is calculated using the formula:

$$IPc = \text{CC at rest (cm)} / \text{height (m)} \times 100\%$$

Classification	IPc	Type of body proportions
Broad chest	56 and more	brachymorphic
Middle chest	51,0-55,9	mesomorphic
Narrow chest	50,9 and less	dolichomorphic

**11. Abdominal circumference** measured in a standing position around the torso when applying a centimeter tape in front at the level of the navel point, behind - through the middle of the lumbar region.

Measurements are carried out three times: in the usual position (at rest), with the abdomen maximally protruding (item 12) and maximally retracted (item 13) - the tape is not removed.



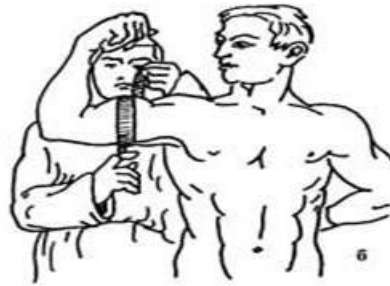
Abdominal circumference values in men and women:

Sex	Norm	Anxiety zone	Consultation of a specialist
Men	less 94 cm	94-101 cm	102 cm and more
Women	less 80 cm	80-87 cm	88 cm and more

**14. Abdominal dissimilarity** – the difference between the coverage of the maximally bulging and maximally retracted abdomen. Normally, this difference should be approximately 15% of the circumference of the abdomen in the usual position. A smaller difference, especially in combination with a bulging, sagging stomach, indicates weak abdominal muscles.

**15. Shoulder circumference** – measured in a standing position under stress (item 15) and at rest (item 16).

At the beginning - in a state of tension (item 15).



- The examinee clenches his fist, bends it at the elbow joint, raises it to the horizontal level and maximally strains the shoulder muscles. A centimeter tape is placed on the most convex part of the biceps (biceps muscle).
- Then, in the same place, without moving the tape, measure the circumference of the shoulder with a relaxed (item 16) and lowered arm.

**Pay attention.** There may be differences between the obtained circumference values of the left and right shoulders.

**17. . Soulder dissimilarity** – the difference between shoulder girth in a tense state (para. 15) and in a relaxed (para. 16) state.

**Pay attention.** There may be differences between the obtained excursion values of the left and right shoulders.

**18. Degree evaluation** of muscle development is determined based on the value of the muscle development index:

$$DEm = (SCiT - SCaR) / SCaR \times 100\%$$

де: SCiT – shoulder circumference in tension (cm), SCaR – shoulder circumference at rest (cm).

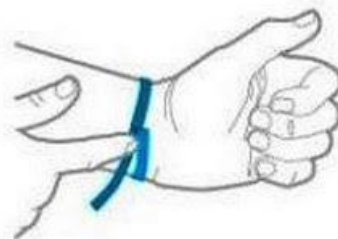
Muscle development	DEm
Strong	12,0 and more
Average	5,0-11,9
Weak	4,9 and less

**Pay attention.** There may be differences between the obtained values of the development of the muscles of the left and right shoulder.

**19. Circumference of the forearm** measured by placing a centimeter tape horizontally in the place of greatest muscle development with the arm freely lowered.

**Pay attention.** There may be differences between the obtained values of the circumference of the left and right forearm.

**20. Wrist circumference** – carried out in the narrowest part of the ray-carpal joint.



Sex	Fragile physique	Average build	Strong physique
Men	16,5 cm and less	16,6-18 cm	18,1 cm and more
Women	14,0 cm and less	14,1-16,5 cm	16,6 cm and more

**Pay attention.** There may be differences between the obtained values of the circumference of the left and right wrist.

**21. Hip circumference** – when measuring the circumference of the thigh, the tape is placed at the place of greatest fullness in the medial direction under the buttock fold and closed on the outer surface of the thigh.

- The examinee stands straight, legs at shoulder length, body weight evenly distributed on both legs.



**Pay attention.** There may be differences between the obtained values of the circumference of the left and right hip.

**22. Index of the ratio of the circumference of the abdomen to the circumference of the hips** – is the optimal indicator of the presence of abdominal fat in the body.

When measuring **hip circumference** - wrap the centimeter tape around the thighs parallel to the floor so that the tape goes along the widest part of the thighs.



It is determined by the formula:

$$I = AC / HC,$$

where: AC - Abdominal circumference at rest (cm), HC – hip circumference (cm).

The obtained figure should be considered as a signal about the risk of cardiovascular diseases and other diseases associated with excess weight:

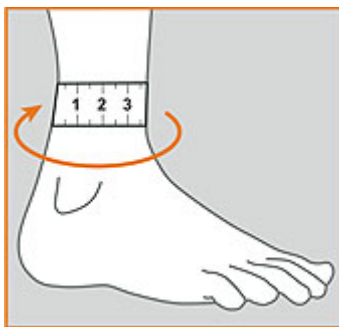
Sex	Low level of risk	A moderate level of risk	High level of risk
Men	0,95 or less	0,96 – 1,0	from 1,1 and more
Women	0,80 or less	0,81 – 0,85	from 0,86 and more

**23. Leg circumference** - when measuring the circumference of the lower leg, the tape is applied to the place of greatest development of the calf muscle.



- • The examinee stands straight, legs at shoulder length, body weight evenly distributed on both legs.

**24. Ankle circumference** – measured at the narrowest point of the ankle - 4-5 cm above the lower leg point.



To determine the body type, you can use the ratio of the wrist and leg circumferences for people of normal (average) body (according to the materials G. Tenko):

Height, cm	Wrist circumference, cm.	Ankle circumference, cm
152,5	15,9	19,6
155	16,2	19,9
160	16,7	20,6
165	17,3	21,3
170	17,8	22,0
175	18,4	22,7
180	19,0	23,4
185	19,6	24,1
187,5	19,8	24,5

**Pay attention.** If the circumference of the wrist (or ankle) is more than 0.8 cm, what is indicated in the table is a wide body type (strong body, wide chest), and if it is less than that - a narrow-boned type (fragile body , narrow chest).

### ASSESSMENT OF THE FUNCTIONAL STATE

The functional state of the organism is the state of the living system, which determines the level of vital activity of the organism, the systemic response to physical

exertion, and makes it possible to assess the level of adaptation of the organism to the environment and to the tasks assigned to it.

The functional state is defined as an integral characteristic of a set of functional indicators of various organs and body systems.

In practice, various tests and functional tests have been widely used during medical monitoring of people, during mass examinations, especially during sports and physical activities..

A functional test is a precisely dosed effect on the body of various factors that allows you to study the reaction of physiological systems to one or another effect and allows you to get an idea of the functional state of the body in conditions of active life.

One of the most accessible functional tests is the orthostatic test.

Orthostatic test - based on the fact that the tone of the sympathetic division of the autonomic nervous system and, accordingly, the heart rate increase when moving from a horizontal position (clinostatic) to a vertical (orthostatic).

The orthostatic test should be carried out according to the following rules:

- Spend in good health and well-being.
- The presence of an assistant is desirable.

#### **Test procedure.**

- Palpation of the pulse is carried out with the index and middle fingers, which moderately press the artery to the inner side of the radius. To determine them, count the number of pulse waves.



- After lying down for at least 3-5 minutes, the subject's pulse rate is counted for 15 seconds and the result is multiplied by 4. Thus, the initial heart rate for 1 minute is determined and recorded in the corresponding column of the table.

- After that, the subject slowly (in 2-3 seconds) gets up on the floor (takes a vertical position). At the end of the 1st minute of standing (that is, when the heart rate stabilizes), his heart rate is again determined (based on pulse data for 15 seconds, multiplied by 4) and recorded in the next column of the table.

- Knowing  $HR_1$  in a lying position and  $HR_2$  in a vertical position at the end of the 1st minute, determine their difference, that is, the reaction of the cardiovascular system of the body.

- Record the obtained final result in the appropriate column of the table.

Principles of evaluating the results of the 1st minute of the orthostatic test (according to materials G.A. Makarova, 2003):

Mark	Dynamics HR, b/m
Perfectly	from 0 to+10
Fine	from 11 to+16
Satisfactorily	from 17 to+22

Unsatisfactorily	more then +22
Unsatisfactorily	from -2 to -5

- A normal reaction to the test is an increase in heart rate by 10-16 beats in 1 minute immediately after lifting.
- After stabilization of this indicator, after 3 minutes of standing, the heart rate decreases slightly, but it is 6-10 beats per 1 minute higher than in a horizontal position.
- A stronger reaction indicates increased reactivity of the sympathetic part of the autonomic nervous system, which is characteristic of insufficiently trained individuals.
- A weaker reaction is observed in case of reduced reactivity of the sympathetic part and increased tone of the parasympathetic part of the autonomic nervous system.
- Weaker reaction, as a rule, accompanies the development of the state of training.

**Pay attention.** Gradation of heart rate in adults at rest:

- 60-80 b/m – normal HR;
- 80-100 b/m – accelerated HR;
- 100 b/m – tachycardia;
- 59-50 b/m – slowed down PK;
- less 50 b/m – bradycardia.

## LITERATURE

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THE MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

National technical university  
«Kharkiv polytechnic institute»

«PHYSICAL EDUCATION» DEPARTMENT

**Practical work**

«Anthropometric measurements and assessment of functional status»

for the discipline "Physical education"

Completed by student of group\_\_\_\_\_

\_\_\_\_\_  
(name, surname)

Checked by the teacher

\_\_\_\_\_  
(surname, initials)

Kharkiv 2023

**BODY DIMENSIONS MAP**  
**Body dimensions (cm) and body weight (kg)**

№	Measurable features	The magnitude of the sign	
		right	left
1	Height, cm		
2	Weight, kg		
3	Body mass index (BMI, kg/m <sup>2</sup> )		
4	Head circumference (cm)		
5	Neck circumference (cm)		
6	Chest circumference at rest (cm)		
7	Circumference of the chest on inhalation (cm)		
8	Circumference of the chest on exhalation (cm)		
9	Chest dissimilarity (cm)		
10	Breast proportionality index (IPb)		
11	Abdominal circumference at rest (cm)		
12	The circumference of the maximally bulging abdomen (cm)		
13	The circumference of the maximally retracted abdomen (cm)		
14	Abdominal dissimilarity (cm)		
15	Shoulder circumference in tension (cm)		
16	Shoulder circumference at rest (cm)		
17	Shoulder dissimilarity (cm)		
18	Muscle development index		
19	Circumference of the forearm (cm)		
20	Wrist circumference (cm)		
21	Hip circumference (cm)		
22	Index of the ratio of the circumference of the abdomen to the circumference of the hips		
23	Leg circumference (cm)		
24	Ankle circumference (cm)		

**Analysis and description of the results of anthropometric measurements**

(detection of deviations, own attitude, etc).

Body mass index - \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Chest dissimilarity - \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Abdominal dissimilarity - \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Shoulder dissimilarity - \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Muscle development index - \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Index of the ratio of the circumference of the abdomen to the circumference of the hips -  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Body type - \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**ASSESSMENT OF THE FUNCTIONAL STATE**  
**Orthostatic test**

№	Measurable features	The magnitude of the sign
1	Heart rate while lying in a horizontal position at rest in 15 s x 4	
2	Heart rate - stand up slowly (in 2-3 s) take a vertical position, measure the pulse after first minute in 15 s x 4	
3	Reaction of the cardiovascular system of the body	

**Analysis and description of the results of the orthostatic test** (detection of deviations, own attitude, etc).

Reaction of the cardiovascular system of the body -

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**Conclusions** (concise statement of the results of the work; solving the tasks set in the process of analysis; performed calculations, evaluations and their explanation; theoretical and (or) applied value of quantitative and qualitative indicators of the obtained results; own attitude, etc.):

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Date\_\_\_\_\_

**«Anthropometric measurements and assessment of functional status»**

Guidelines

to practical work for students NTU «KhPI» full-time study of all specialties in the  
discipline "Physical Education"

In the author's edition

Department of physical education  
NTU «KhPI»  
2023