

**Federal state budgetary educational institution of higher education  
"North Ossetian State Medical Academy"  
Ministry of Health of the Russian Federation**

**CHAIR OF GENERAL HYGIENE  
AND PHYSICAL CULTURE**

## **METHODS OF EVALUATION AND POSTURE CORRECTION**

Methodological recommendations  
on the organization of independent work and study of the  
disciplines "Physical culture and sports" and "Elective course in  
physical culture and sports" of the main professional educational  
program of higher education – specialty program in the specialty  
31.05.03 Dentistry (partially implemented in English)

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Violations of posture, especially during the growth period, can cause persistent deformities of the bone skeleton. All deformities of the musculoskeletal system (scoliosis, lordosis, flat back, stooping, flat feet) are more common in people with a weakened state of health. Therefore, the fight against posture defects should be considered as a matter of general improvement of the body.

In the proposed methodological recommendations, the problems of posture are considered, the means and methods of its assessment and correction are systematized and justified. In an accessible form, modern knowledge that is necessary for the formation of a healthy lifestyle is presented, and the dominant role of physical culture in maintaining health is shown.

The presented materials meet the requirements of the educational standard for students of medical universities. It is advisable to conduct training sessions with students of a special medical group studying in the specialty "Medical care", "Dentistry", "Pediatrics", "Medical and preventive care", "Pharmacy".

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**THE PURPOSE OF THE LESSON:** to create an idea of the methods of assessment and correction of posture among students of the medical university.

**THE STUDENT SHOULD KNOW**

- the concept and characteristics of correct posture;
- causes of posture disorders;
- types of posture disorders;
- basic rules for maintaining proper posture

**THE STUDENT MUST BE ABLE TO:**

- perform basic and general developmental exercises for correction posture

**ISSUES TO BE ADDRESSED:**

- the concept of posture;
- causes of posture disorders;
- types of posture disorders;
- basic rules for maintaining posture;
- methods of posture correction.

**RECOMMENDED LITERATURE**

1. Popov S. N. Therapeutic physical culture. – M.: Physical Culture and Sport, 2012.
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## **1. The concept of posture**

Posture – the usual pose of a person standing at ease. It depends on spine shape, uniformity, physical development, muscle tone of the body (weakness of the muscles, ligaments). Correct posture is not only aesthetic, but also of great physiological importance: it increases efficiency, affects the activity of internal organs, especially the respiratory and circulatory organs.

Correct posture is, first of all, balancing the position of the body, in which the load on the spine is distributed evenly. The basis of correct posture is not only the spine, but the muscles that are adjacent to it, they hold it in the correct position. The correct posture of a person immediately attracts attention, since it is not often found.

Normal (correct) posture is characterized by a symmetrical arrangement of body parts relative to the spine. Posture is examined and described from head to toe. Especially informative are visual observations of the vertebral column from the front, back, and side.

When viewed from the front, a person with a correct posture determines the strictly vertical position of the head: the chin is slightly raised, the line of the upper arms is horizontal; the angles formed by the lateral surface of the neck and the upper arm are symmetrical; the chest has no recesses or protrusions; the abdomen is also symmetrical; the navel is on the middle line.

During the examination of posture from the rear of the blade close to the body are located at the same distance from the spine, and the corners on the same horizontal line, triangles waist symmetric gluteal and popliteal folds on the same level.

When viewed from the side – the chest is slightly raised, the abdomen is pulled up, the lower limbs are straight, the physiological curves of the spine are moderately pronounced, the angle of inclination of the pelvis is within 35–55°.

Determine the correct posture can not only a specialist doctor, but also you yourself. To do this, you need to stand naked in front of a large mirror and examine yourself from all sides – front, back and in profile. Analyze your posture—you have symmetrical or asymmetrical shoulders, shoulder blades; normal or excessive convexity (concavity) of the physiological curves of the spine, whether or not the triangles of the waist are uniform.

## 2. Causes of posture disorders

Deviations from the correct posture are usually called violations or defects of posture. With violations of posture, new conditioned–reflex connections are formed, which fix the wrong position of the body, and the skill of correct posture is lost.

The causes of violation of the normal position of the spine are congenital and acquired. Congenital causes of posture disorders include pathology that develops at the stage of intrauterine development of the fetus (underdevelopment of the vertebrae or their parts, wedge-shaped and additional vertebrae, etc.).

Acquired causes of normal posture disorders:

- various diseases in which the spine, back muscles, ligaments and joints are drawn into the pathological process (rickets, tuberculosis, osteochondrosis, tumor lesion of the vertebrae, connective tissue disease);
- spinal injuries (fractures, dislocations, sprains and tears of muscles, ligaments);
- defects of the musculoskeletal system (flat feet, different leg lengths);
- visual disturbances, especially nearsightedness and strabismus, which cause a person to constantly adopt an incorrect and non–physiological working position;
- features of professional employment of a person (long stay in one position), for example, working at a computer;
- insufficient development of the muscles.

Most often, the cause of a violation of normal posture is dynamic and static overstrain of the spine during its formation and growth (incorrect posture at the table, prolonged stay at the computer, etc.).

Posture defects are associated with a deviation from the normal physiological curves of the spine. Normally, there are four of them: cervical and lumbar lordosis (bulge forward), thoracic and sacrococcygeal kyphosis (bulge back). These bends are of great importance, performing a spring function, i.e. reducing concussion when walking, running, jumping. The depth of bends should normally not exceed 3–4 cm (in the lumbar region – up to 5 cm, in the cervical region–up to 2 cm).

### 3. Types of posture disorders

With a violation of posture, the internal tension in the vertebrae and discs sharply increases, the flexibility of the spine decreases, it becomes more vulnerable to physical exertion and injuries, it bends and leads to deformities.

There are the following types of posture disorders (Fig. 1):

- a) stooping;
- b) round back;
- c) round–concave back;
- d) flat back;
- e) flat–concave back.

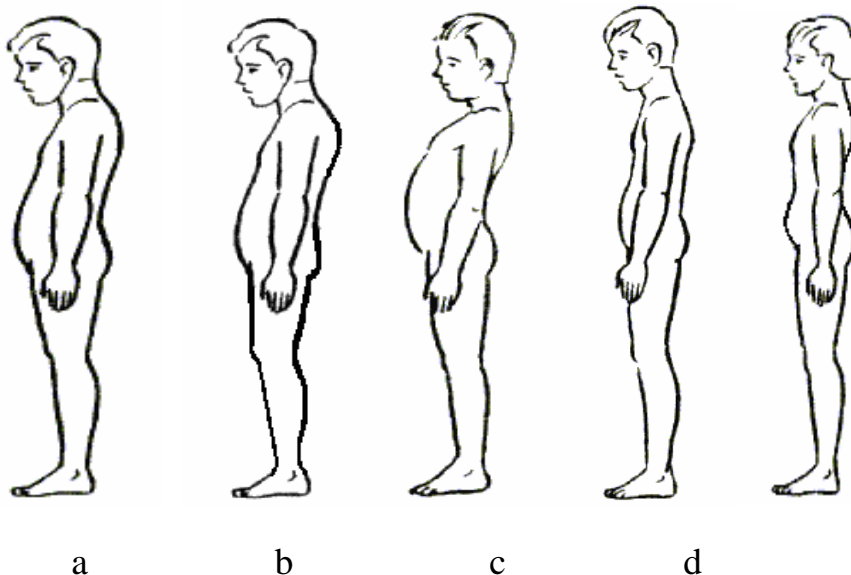


Figure 1

Each posture disorder is characterized by a specific position of the spine, shoulders, chest, shoulder blades, abdomen, pelvis and lower extremities.

#### **Stoop**

Stooping is the most common type of posture disorder, which is manifested by excessive bending – kyphosis of the spine in the thoracic region and a decrease in lumbar lordosis and an increase in cervical lordosis. With a stoop, the head is pushed forward, the upper arms are raised, and the shoulder joints are brought together, the shoulder blades are wing-shaped.

Stoop appears in adolescence at 11–15 years of age during the period of active growth. The main causes of stooping are weakness of the back muscles and

a long tilt of the body position at the desk, at the computer, at the machine. Most often suffer from slouching sedentary, poorly developed physically teenagers who

spend a lot of time at the computer or reading books, squeezed, insecure. Tall teenagers are more prone to stooping.

Slouching not only spoils the figure, but also harms health. When stooping, the blood supply to the internal organs of the chest becomes difficult and the work of the respiratory system, cardiovascular system and digestion worsens. Stooping causes pain in the neck and upper back and leads to the development of osteochondrosis of the thoracic spine.

### **Round back**

With a round back, the thoracic bend – kyphosis of the entire spine – significantly increases and there is no lumbar bend – lordosis. The spine resembles an arc. A person is forced to walk and stand on half-bent legs to maintain balance. With this violation of posture, the center of gravity shifts, and the angle of the pelvis decreases. The head leans forward, the shoulders are brought together, the chest sinks, the shoulder blades diverge to the sides, the stomach protrudes, the arms move forward of the trunk.

### **Round-concave back**

A round-concave back is manifested by an increase in all physiological curves of the spine. A person with round-concave back, the abdomen protrudes forward, head forward, raised shoulder girdle, shoulder the, the legs are slightly bent in the knee joints, shoulder wing.

### **Flat back**

With a flat back, lumbar lordosis and the angle of inclination of the pelvis are reduced. The chest moves forward, the lower part of the abdomen protrudes, the back is straight as a board. The shoulder blades are pterygoid. The muscles of the back, chest, and abdomen are weakened. With such a violation of posture, it is difficult for a person to jump and run.

### **Flat-concave back**

With a flat-concave back, thoracic kyphosis decreases, and lumbar lordosis is slightly increased or remains normal, cervical lordosis is also slightly increased. The pelvis moves back, the legs are slightly bent at the knee joints, the shoulder blades are wing-shaped.

A typical violation of posture in the frontal plane is asymmetric posture, when there is a pronounced asymmetry between the right and left halves of the trunk: the

waist triangles are not uniform, the shoulder and shoulder blade of one side of the body are lowered compared to the other side (Fig.2).

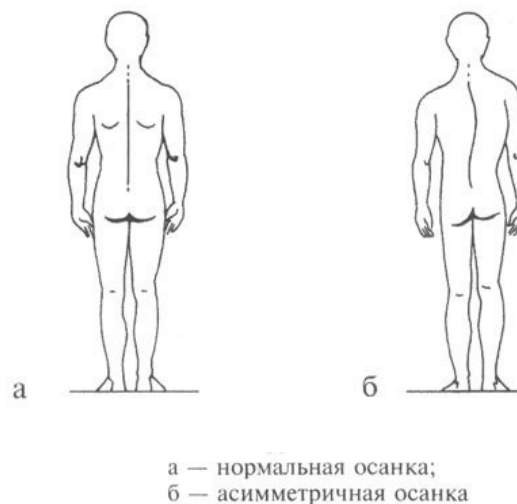


Fig. 2

Often this posture is diagnosed with "scoliosis". This is not true. The asymmetry of individual parts of the body does not give grounds for making such a diagnosis. For the diagnosis of "scoliosis", it is necessary to identify the torsion of the vertebrae (twisting them in the process of growth).

### **Asymmetrical posture**

The asymmetry of the shoulders and the lateral curvature of the vertebral column lead to a violation of the proportionality of the waist triangles. Triangle the waist is the space between the elbow joint of the freely lowered arm and the waist. If the size of the waist triangles is not the same on the right and left, you need to look for scoliosis or shoulder asymmetry. Asymmetric rib bulge in the thoracic region and "muscle roll" in the lumbar region are the result of torsion deformation of the spine (twisting) and indicate the presence of scoliotic disease. The torsion of the spine is revealed in the position of bending the trunk forward with the legs straightened in the joints and the arms lowered down relaxed. The slope is slow. An examination from the front allows you to detect torsion in the thoracic spine, an examination from the back torsion in the lumbar spine. If you detect torsion of the spine, you should consult an orthopedic doctor.



#### **4. Basic rules for maintaining posture**

The primary tool that is able to maintain a correct posture and to correct its violations, is gymnastics. Corrective gymnastics should be performed at least three times a week. The duration of one gymnastics class can be from 15 to 25 minutes. Results from classes (systematic) appear in 3–4 months. To consolidate the achieved result, it is necessary to engage in at least a year, and in the future, support it by conducting preventive measures.

The effectiveness of using special corrective exercises largely depends on the choice of starting positions. The best ones are those in which the maximum load of the spine of the axis, and excludes the effect on muscle tone, determining the angle of inclination of the pelvis. These include: starting positions lying on your back, stomach and standing in a stop on your knees.

##### **Rules for maintaining proper posture**

1. Perform exercises to strengthen the muscles of the trunk.

2. Sit with your back as straight as possible. It is important to avoid uncomfortable poses. Every 15 minutes of sitting at the table, you need to change your posture, move your arms and legs, stretch, and every 30 minutes you must get up, walk or lie down. Therefore, for those who spend a long time sitting, it is very important to be able to relieve the back muscles and spine, change position, leaning on the back of a chair. In order to "sedentary" work does not lead to violations of posture, chair and table must correspond to the hygienic norms: the back of the chair above the shoulders, the seat is hard and smooth; the seat height is equal to the length of the tibia, the depth of no more than 4/5 lengths of hips; cover the table – on the level of the elbow of the bent arm. Under the table, you should have enough space for your feet, because their position should be changed from time to time. Do not put your feet on your feet while working, this leads to an asymmetric posture. However, it is allowed to put one foot on the other in the area of the ankle joints.

3. In the process of walking, the head should be raised high, the hands move rhythmically from the shoulder, the spine is stretched, the stomach is drawn in.

4. When carrying heavy loads, you need to load your hands evenly.

5. Sleep on a hard bed with a low pillow. A hard, flat, but sufficiently elastic mattress allows the bones of the shoulders and pelvis to form their own natural

deflection. A small and fairly soft pillow for the head and neck allows you to keep the upper part of the spine in a straight position so that the muscles can completely relax during sleep. Sleeping on your back or on your stomach does not give your spine adequate support.

6. Stand and perform various work should also be as straight as possible back. At the same time, it is important to find sufficient support for the head, torso, arms and legs. The most appropriate position during operation standing is considered to be setting a foot apart with a small turn out, the body weight on the front part of the feet, knees straight, stomach in, shoulders deployed. After a long standing, it is necessary to lie down (relieve the spine).

## **5. Methods of posture correction**

In the formation of correct posture, a healthy lifestyle is of great importance, which includes:

- a complete and vitamin-rich diet;
- regular exposure to fresh air;
- outdoor games;
- morning hygienic gymnastics;
- health training – walking, running, swimming, etc.;
- active recreation (hiking, cycling);
- compliance with the necessary motor minimum;
- giving up bad habits;
- the mode of the day.

Also, the presence of correct posture is impossible without active physical exercises. Well-trained muscles securely hold the spine in an upright position, helping it to withstand heavy loads and, thus, maintain proper posture.

When starting to perform health-improving exercises, you should remember the following:

- do not make sudden efforts without warming up the muscles;
- perform exercises, measuring the load with your abilities;
- do not try to perform exercises with maximum amplitude.

During the first week, do the exercises slowly. If you feel pain or fatigue, stop performing them for a while. At first, you will feel pain in your muscles, do not stop, after a few days of training, the pain will pass.

### **Basic exercise for posture**

Stand with your back to the wall, legs slightly apart, arms loosely lowered. The back of the head, legs, shoulders, calves and heels touch the wall. Try to lean against the wall so that the distance between the wall and the lower back is no more than the thickness of a finger. Pick up your stomach, stretch your neck up a little and raise your shoulders. Feel the condition of all parts of the body, especially the muscles of the back and abdomen. In other words, start programming your spinal computer in a normal posture position. Do this exercise as often as possible throughout the day. As soon as you can hold this position of the body against the wall for 1 minute without fatigue, then, keeping the same posture, go ahead.

### **General development exercises**

1. Lying on your back, hands to the sides, a tennis ball in your right hand. Join hands in front, shift the ball to the left hand. Return to the starting position. Join hands in front, shift the ball to the right hand. Return to the starting position. To look for the ball. Repeat 10–12 times.

2. Lying on your back, arms along your torso, ball in your right hand. Raise your hand up (behind your head) and, lowering it, shift the ball to the other hand. Repeat the same with the other hand 5–6 times. To look for the ball. When raising the hands –inhale, when lowering–exhale.

3. Lying on your back, hands forward–to the sides. Perform the surrounding movements with straight hands for 15–20 seconds. Follow the movement of the hand of one, then the other hand. Breathing is arbitrary.

4. Lying on your back, hands forward–to the sides. Swing one foot to the opposite hand. Repeat 6–8 times with each foot. Max to perform quickly. During the mach –exhale.

5. Lying on your back, hold a volleyball ball in your hands raised forward. Swing your foot with the toe of the ball. Repeat 6–8 times with each foot. Look at the sock. During the mach –exhale.

6. Lying on your back, hands forward. Perform the surrounding movements with your hands, lowering and raising them. Follow the brush of one hand, then the other. Perform 15–20 seconds.

7. Lying on your back, hold a tennis ball in your right hand, raised forward. Perform circular back and forth movements with your hand for 20 seconds. To look for the ball. Change direction after 5 seconds.

8. Sitting on the floor, hands on the back, straight legs slightly raised. To execute the surrounding movement of 15–20 s. the Head does not rotate. Don't hold your breath.

9. Sitting on the floor, hands on the back, straight legs. Alternately raise and lower your legs. Perform 15–20 seconds. Look at the toe of one foot.

10. Sitting on the floor, rest your hands on the back. Swing your right foot up and to the left, return to the starting position. The same with the left foot up—to the right. Repeat 6–8 times with each foot.

11. Sitting on the floor, rest your hands on the back. Take the right leg to the right, return to the starting position. Repeat the same with the other leg to the left 6–8 times with each leg.

12. Sitting on the floor, hands on the back, straight leg slightly raised. Perform circular movements with the foot in one direction and the other. Repeat 10–15 seconds with each leg.

13. Sitting on the floor, keep your hands behind you, but both legs are raised. Perform circular movements in one direction and the other for 10–15 seconds.

14. Standing, hold the gymnastic stick at the bottom. Raise the stick up, to cave in – breath, lower the stick through it. Look at the stick. Repeat 8–12 times.

15. When standing, hold the gymnastic stick at the bottom. Sit down and lift the gymnastic stick up, return to the starting position. Look at the stick. Repeat 8–12 times.

16. When standing, keep the dumbbells in front. Circular movements of the hands in one and the other direction –15–20 s. Look at one or the other dumbbell. Perform circular movements for 5 seconds in one direction, then 5 seconds in the other.

17. While standing, keep the dumbbells in front. One hand to raise, the other –to lower, then vice versa–15–20 s. Look at one or the other dumbbell.

18. Standing, dumbbells in the lowered hands. Lift the dumbbells up, then lower. Look first at the right dumbbell, then at the left. Look at the right dumbbell again. Perform eye movements in one direction and the other for 15–20 seconds. Change the direction of eye movement after 5 seconds.

19. Standing, with the hoop held out at arm's length. Rotate the hoop in one direction, then in the other direction for 20–30 seconds. Look at the brush. Perform with one hand and the other.

20. Standing, look only forward at any object. Turn your head to the right, then to the left. Repeat 8–10 times in each direction.

21. Standing, look only forward at any object. Raise your head, then lower it without changing your gaze. Repeat 10 times. Look at an object.

## **CONTROL AND TRAINING TESTS**

### **1. When viewed from the front of the person with a correct posture observed, the position of body parts:**

- a) the chin is slightly raised, the line of shoulder horizontal; the angles formed by the lateral surface of the neck and nadpisyam, symmetrical; thorax does not have Zapadni or protrusions; the abdomen is also symmetric; the navel is on the middle line;
- b) the chin is slightly lowered; the angles formed by the lateral surface of the neck and the upper arm are symmetrical; the chest has a sinking or protruding; the abdomen is symmetrical; the navel is on the midline;
- c) the chin is slightly raised, the line of the upper arms is horizontal; the angles formed by the lateral surface of the neck and the upper arm are asymmetric; the chest has sinking or protruding; the abdomen is also asymmetric

### **2. When viewed from behind a person with correct posture, the following position of the body parts is observed:**

- a) the shoulder blades are pressed against the body, located at different distances from the spine, the waist triangles are asymmetric, the gluteal and popliteal folds are also asymmetric;
- b) the blades close to the body are located at the same distance from the spine, and the corners on the same horizontal line, triangles waist symmetric gluteal and popliteal folds on one level;
- c) the shoulder blades are removed from the body and are located at different distances from the spine, the triangles of the waist, the gluteal and popliteal folds are asymmetric

### **3. When viewed from the side of a person who has the correct posture, the following position of the body parts is observed:**

- a) the chest is slightly raised, the abdomen is pulled up, the lower limbs are straight, the physiological curves of the spine are moderately pronounced, the angle of inclination of the pelvis is within 35–55°;
- b) the chest is slightly lowered, the physiological curves of the spine are practically not observed, the angle of inclination of the pelvis is in the range of 55–65°;

- c) the chest is slightly lowered, the abdomen is relaxed, the lower limbs are straight, the physiological curves of the spine are moderately pronounced, the angle of inclination of the pelvis is in the range of 55–65°

**4. For this posture, round back, is typical:**

- a) increase in all the physiological curves of the spine; the abdomen protrudes forward, head forward, raised shoulder girdle, shoulder the, the legs are slightly bent in the knee joints, shoulder wing;
- b) reduction of lumbar lordosis and pelvic angle; the chest moves forward, the lower part of the abdomen protrudes, the back is straight as a board, the shoulder blades are pterygoid; the muscles of the back, chest, abdomen are weakened;
- c) significantly increased thoracic curve – kyphosis of the spine, and no lumbar curvature–lordosis; spine resembles an arc; the angle of pelvis is reduced, the head is bent forward, shoulders kept, the chest sinks, the blades diverge to the sides, the abdomen protrudes, arms shifted forward body;
- d) reduction of thoracic kyphosis; lumbar lordosis is slightly increased or remains normal, cervical lordosis is also slightly increased; the pelvis is shifted back, the legs are slightly bent at the knee joints, the shoulder blades are pterygoid

**5. For such a violation of posture as a round–concave back, typical:**

- a) increase in all the physiological curves of the spine; the abdomen protrudes forward, head forward, raised shoulder girdle, shoulder the, the legs are slightly bent in the knee joints, shoulder wing;
- b) reduction of lumbar lordosis and pelvic angle; the chest moves forward, the lower part of the abdomen protrudes, the back is straight as a board, the shoulder blades are pterygoid; the muscles of the back, chest, abdomen are weakened;
- c) significantly increased thoracic curve – kyphosis of the spine, and no lumbar curvature–lordosis; spine resembles an arc; the angle of pelvis is reduced, the head is bent forward, shoulders kept, the chest sinks, the blades diverge to the sides, the abdomen protrudes, arms shifted forward body;
- d) reduction of thoracic kyphosis; lumbar lordosis is slightly increased or remains normal, cervical lordosis is also slightly increased; the pelvis is shifted back, the legs are slightly bent at the knee joints, the shoulder blades are pterygoid

**6. For such a violation of posture, as a flat back, it is characteristic:**

- a) an increase in all physiological curves of the spine; the abdomen protrudes forward, the head is also pushed forward, the upper arms are raised, the shoulders are brought, the legs are slightly bent at the knee joints, the shoulder blades are pterygoid;
- b) reduction of lumbar lordosis and pelvic angle; the chest moves forward, the lower part of the abdomen protrudes, the back is straight as a board, the

shoulder blades are pterygoid; the muscles of the back, chest, abdomen are weakened;

- c) significantly increased thoracic curve – kyphosis of the spine, and no lumbar curvature–lordosis; spine resembles an arc; the angle of pelvis is reduced, the head is bent forward, shoulders kept, the chest sinks, the blades diverge to the sides, the abdomen protrudes, arms shifted forward body;
- d) reduction of thoracic kyphosis; lumbar lordosis is slightly increased or remains normal, cervical lordosis is also slightly increased; the pelvis is shifted back, the legs are slightly bent at the knee joints, the shoulder blades are pterygoid.

**7. For such a violation of posture, as a flat–concave back, it is characteristic:**

- a) an increase in all physiological curves of the spine; the abdomen protrudes forward, the head is also pushed forward, the upper arms are raised, the shoulders are brought, the legs are slightly bent at the knee joints, the shoulder blades are pterygoid;
- b) reduction of lumbar lordosis and pelvic angle; the chest moves forward, the lower part of the abdomen protrudes, the back is straight as a board, the shoulder blades are pterygoid; the muscles of the back, chest, abdomen are weakened;
- c) significantly increased thoracic curve – kyphosis of the spine, and no lumbar curvature–lordosis; spine resembles an arc; the angle of pelvis is reduced, the head is bent forward, shoulders kept, the chest sinks, the blades diverge to the sides, the abdomen protrudes, arms shifted forward body;
- d) reduction of thoracic kyphosis; lumbar lordosis increased slightly or remained normal cervical lordosis are also slightly enlarged; pelvis moves backwards, legs slightly bent at the knee joints, shoulder wing

**8. In the formation of correct posture is of great importance:**

- a) full–fledged and vitamin–rich nutrition, outdoor games, active recreation, compliance with the necessary motor minimum;
- b) a sedentary lifestyle, full nutrition, the possibility of having bad habits, daily routine;
- c) lack of an active lifestyle, sedentary work, vitamin–rich diet, the possibility of bad habits, daily routine.