

# TA'LIM VA RIVOJLANISH TAHLILI

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## CHANGES IN BLOOD CIRCULATION IN STUDENTS AS A REFLECTION ADAPTIVE PROCESSES TO LEARNING LOADS

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*Annotation:* the article describes changes in the pulse rate and blood pressure dynamics of students with the impact on them of technological progress and adaptive process to the classroom, depending on the age and course of students.

*Keywords:* blood pressure, pulse, computer, mobile phone, systole, diastole, adaptation.

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**Introduction.** Currently, with the development of technology and the computer, the danger of increasing cardiovascular diseases is developing. Due to lack of exercise, many diseases develop, such as obesity, too. For a number of years, we have conducted research to clarify the impact of training sessions on the activity of students' circulatory organs. Since so many students use cell phones, often computer technology, they have increased irritability and this in turn greatly affects the cardiovascular system and its frequency.

**Results and discussion.** Students of the I-IV courses of the agrobiological faculty of 17-22 years of age were examined. Before the start of classes and at the end of them, the maximum, minimum and pulse blood pressure, heart rate was determined daily for a week, and the systolic, minute volume of blood and the coefficient of activity of blood supply to organs were calculated using the formula. The aim of the work was to find out how the blood circulation changes during the school day, as well as with different duration of study at the institute of the first, second and third years. 3000 definitions were carried out for each of the seven indicators during the week. Students, regardless of age, have a wide range of fluctuations in all indicators, but the average values of maximum, minimum and pulse pressure are within the normal range. So, on average for a week, the maximum blood pressure was 103-109 mm Hg, the minimum was 64-69, and the pulse pressure was 34-44 mm. The pulse was quite frequent and ranged on average from 71 to 83 beats per minute. Systolic and minute blood volume, according to our data, was lower than normal in students. The average systolic volume for a week was 39-51 ml, and the minute volume was 2.8-4.1 liters. Students had significant fluctuations between all indicators recorded in the morning, before classes from 7-55 to 8-15 and in the afternoon, after classes, from 13-00 to 15-00. As a rule, all students' maximum and pulse pressure, heart rate, systolic and minute blood volume, and blood supply efficiency coefficient were higher in the morning.

After classes, the indicators decreased, and the minimum blood pressure increased or remained unchanged. Consequently, the blood supply to the organs deteriorated during the training sessions. As an example, the data of a group of first-year students are given: before classes, their maximum blood pressure was  $108 \pm 2$  mm Hg, minimum -  $64 \pm 1$ , pulse rate -  $81 \pm 2$  beats per



minute, systolic volume  $51 \pm 1$  ml minute -  $4.1 \pm 0.1$  l and the efficiency coefficient of blood supply  $35 \pm 2$ . After classes, respectively:  $108 \pm 8$ ,  $69 \pm 3$ ,  $72 \pm 2$ ,  $89 \pm 3$ ,  $2,8 \pm 0,9$ ,  $25 \pm 3$ .

The study of hemodynamic parameters depending on the duration of students' studies yielded the following results.

With a difference of one year of study, older students had only slightly higher blood pressure. The same pattern was observed in third-year students compared to first-year students at the university. As for other indicators (pulse, systolic and minute blood volume and blood supply efficiency coefficient), they were higher in first-year students before classes and lower after classes. This indicates both a significant deterioration of blood circulation in these subjects during classes, and great compensatory possibilities. Fourth-year students compared to first-year students, the difference in the duration of training is 3 years) also had slightly higher blood pressure, both before and after classes and a more frequent pulse.

The first-year students had a larger systolic blood volume before and after classes, but a lower coefficient of efficiency of blood supply than the fourth-year students. The lower values of this indicator for first-year students even before classes, apparently, are due to the overload of their studies and, in connection with this, a decrease in compensatory capabilities.

**Conclusions.** The blood pressure and heart rate of the examined students are within normal limits, and the systolic and minute blood volume are lowered.

Blood circulation indicators change throughout the day, significantly deteriorating after classes. Blood pressure is slightly higher in older students. The value of systolic and minute blood volume, the coefficient of efficiency of blood supply are largely determined not by the age of students and the duration of their studies, but by the academic load.

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